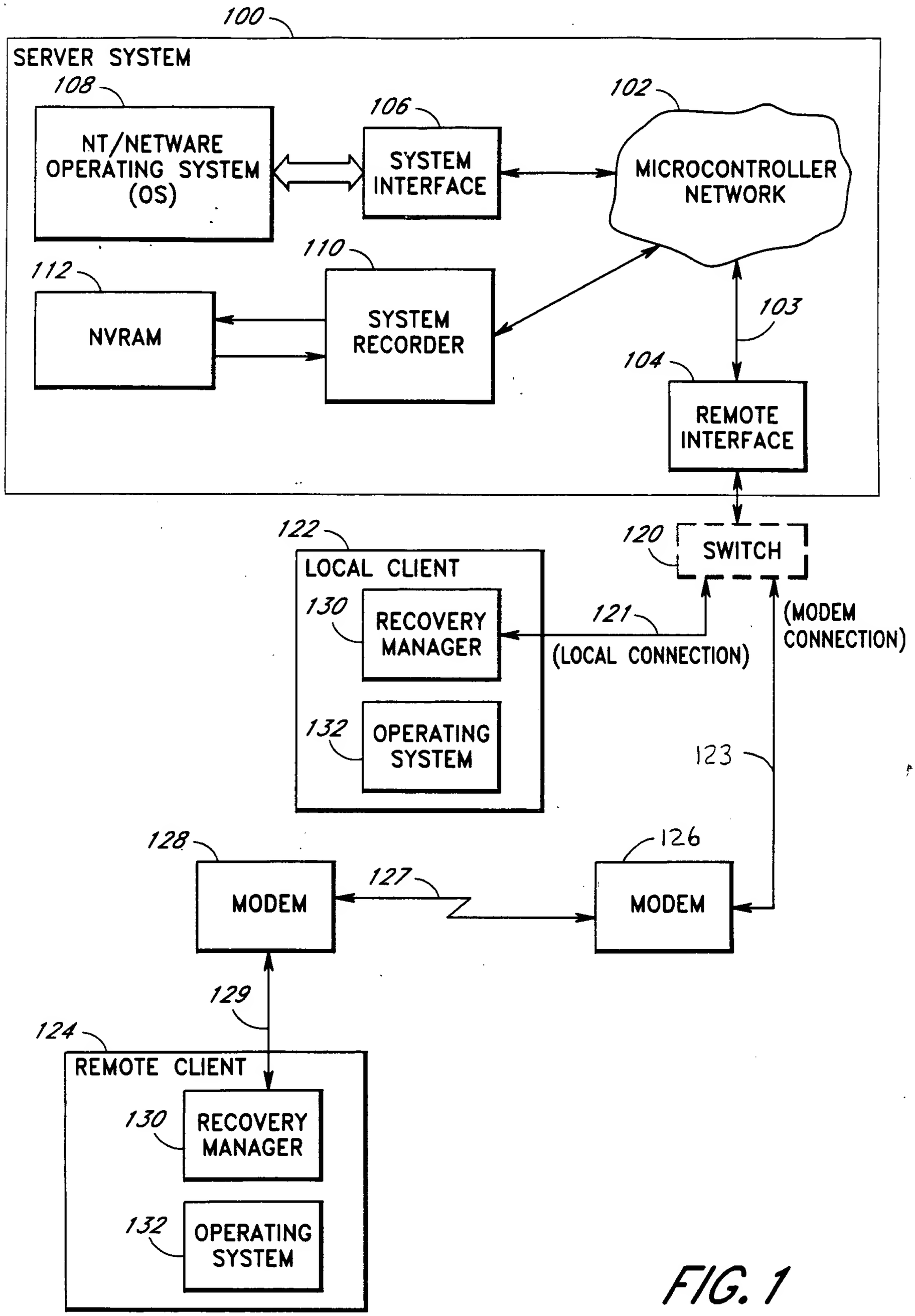

100
SERVER SYSTEM
108
NT/NETWARE OPERATING SYSTEM (OS)
106
SYSTEM INTERFACE
102
MICROCONTROLLER NETWORK
110
112
NVRAM
SYSTEM RECORDER
103
104
REMOTE INTERFACE
120
SWITCH
122
LOCAL CLIENT
130
RECOVERY MANAGER
132
OPERATING SYSTEM
121
(LOCAL CONNECTION)
(MODEM CONNECTION)
123
128
MODEM
127
126
MODEM
129
124
REMOTE CLIENT
130
RECOVERY MANAGER
132
OPERATING SYSTEM

FIG. 1

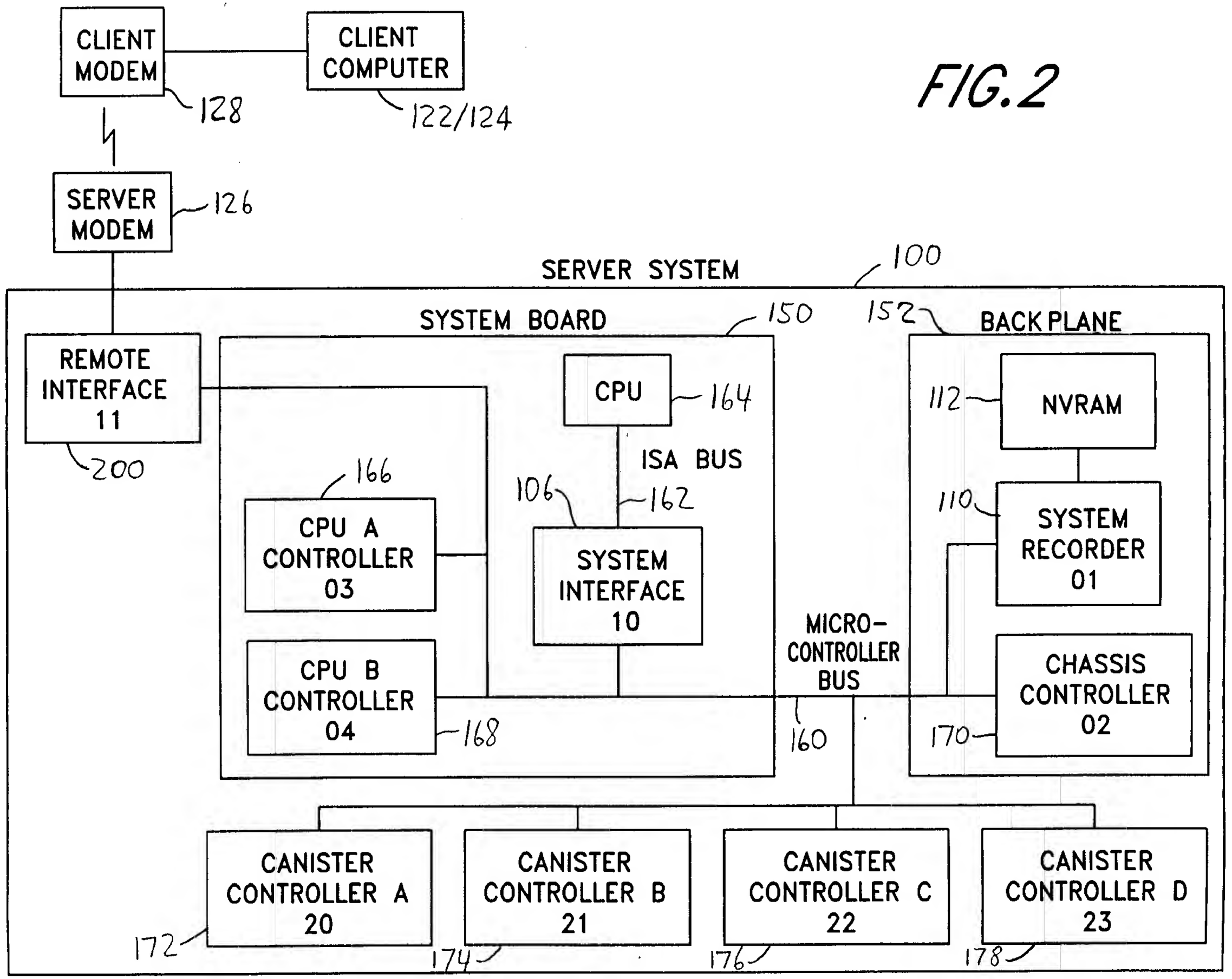


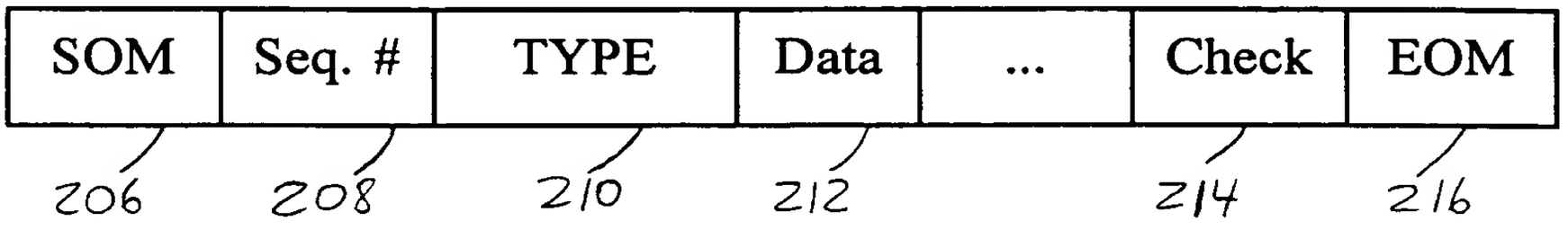
FIG.2

Remote Interface Serial Protocol Message Formats

201

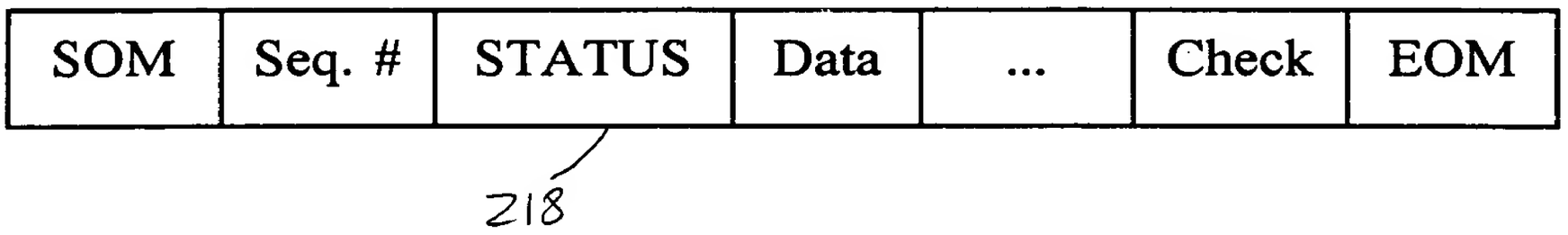
Request:

202 {



Response:

204 {



Event Interrupt

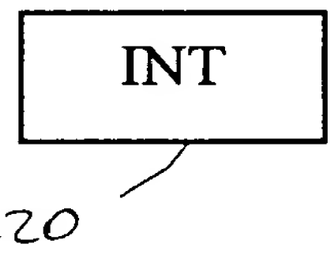


FIG. 3

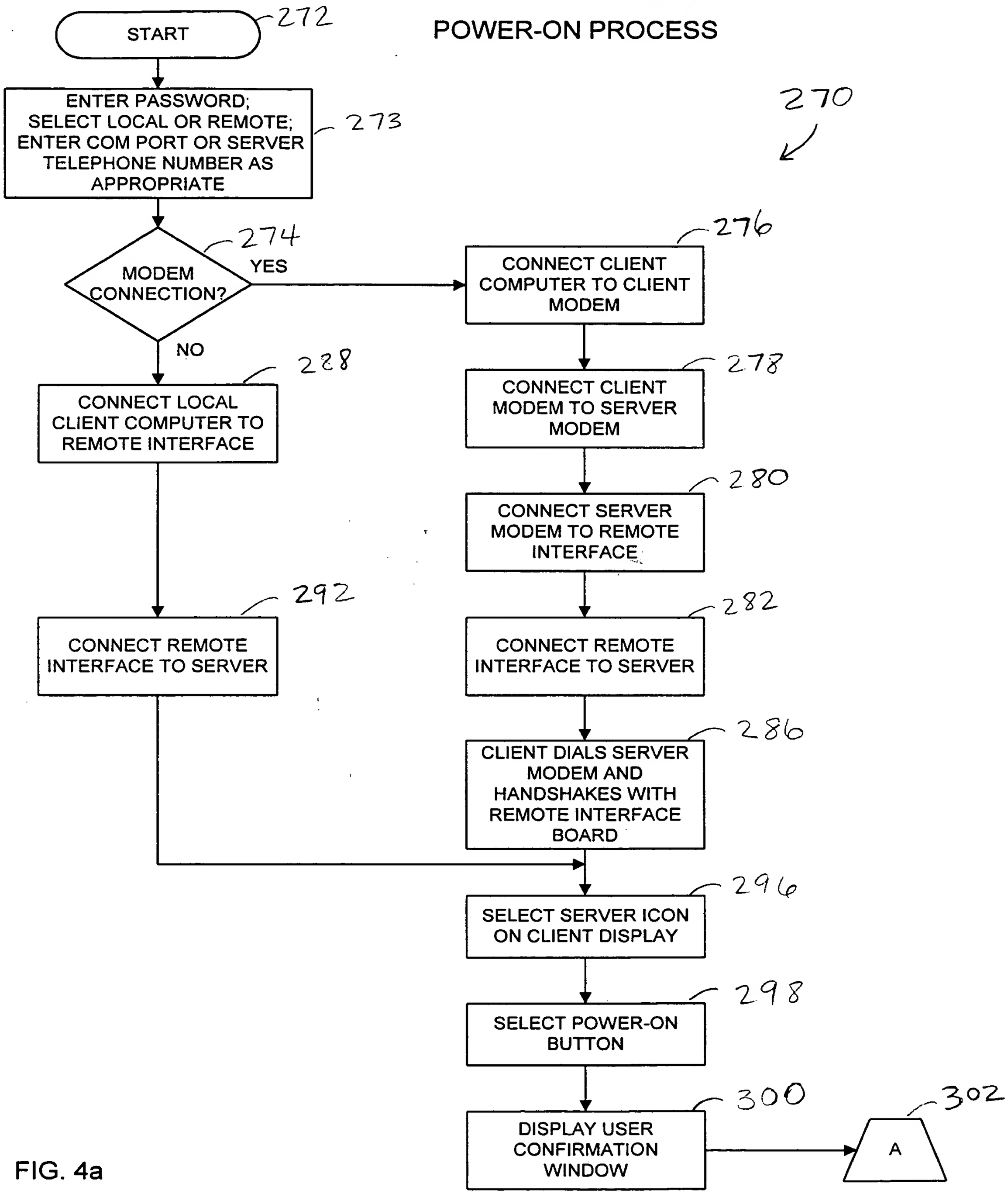

POWER-ON PROCESS
270
START
272
ENTER PASSWORD;
SELECT LOCAL OR REMOTE;
ENTER COM PORT OR SERVER
TELEPHONE NUMBER AS
APPROPRIATE
273
MODEM
CONNECTION?
274
YES
NO
CONNECT CLIENT
COMPUTER TO CLIENT
MODEM
276
CONNECT LOCAL
CLIENT COMPUTER TO
REMOTE INTERFACE
288
CONNECT CLIENT
MODEM TO SERVER
MODEM
278
CONNECT SERVER
MODEM TO REMOTE
INTERFACE
280
CONNECT REMOTE
INTERFACE TO SERVER
292
CONNECT REMOTE
INTERFACE TO SERVER
282
CLIENT DIALS SERVER
MODEM AND
HANDSHAKES WITH
REMOTE INTERFACE
BOARD
286
SELECT SERVER ICON
ON CLIENT DISPLAY
296
SELECT POWER-ON
BUTTON
298
DISPLAY USER
CONFIRMATION
WINDOW
300
A
302

FIG. 4a

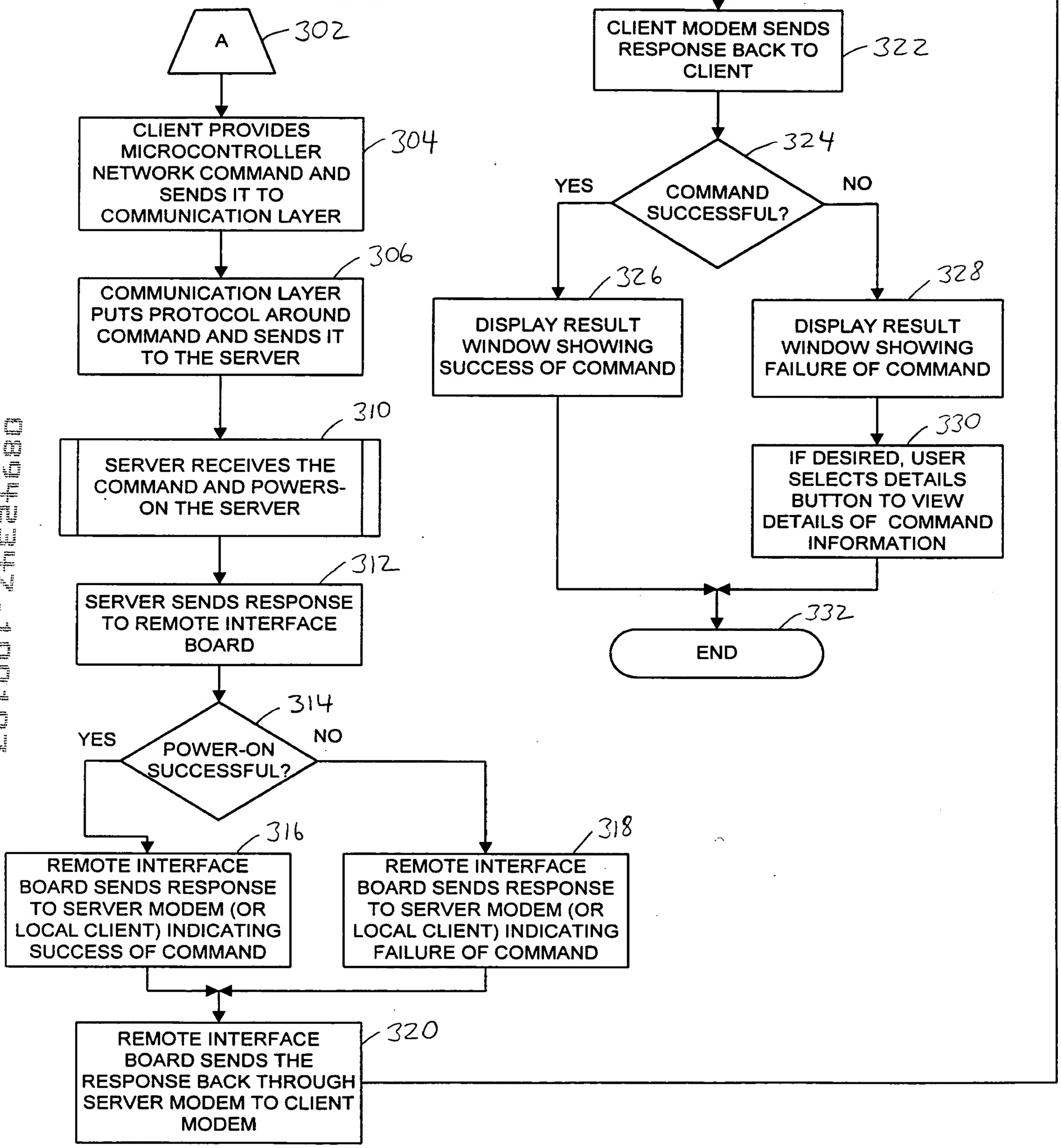

A
302
CLIENT PROVIDES MICROCONTROLLER NETWORK COMMAND AND SENDS IT TO COMMUNICATION LAYER
304
COMMUNICATION LAYER PUTS PROTOCOL AROUND COMMAND AND SENDS IT TO THE SERVER
306
SERVER RECEIVES THE COMMAND AND POWERS-ON THE SERVER
310
SERVER SENDS RESPONSE TO REMOTE INTERFACE BOARD
312
POWER-ON SUCCESSFUL?
314
YES
NO
REMOTE INTERFACE BOARD SENDS RESPONSE TO SERVER MODEM (OR LOCAL CLIENT) INDICATING SUCCESS OF COMMAND
316
REMOTE INTERFACE BOARD SENDS RESPONSE TO SERVER MODEM (OR LOCAL CLIENT) INDICATING FAILURE OF COMMAND
318
REMOTE INTERFACE BOARD SENDS THE RESPONSE BACK THROUGH SERVER MODEM TO CLIENT MODEM
320
CLIENT MODEM SENDS RESPONSE BACK TO CLIENT
322
COMMAND SUCCESSFUL?
324
YES
NO
DISPLAY RESULT WINDOW SHOWING SUCCESS OF COMMAND
326
DISPLAY RESULT WINDOW SHOWING FAILURE OF COMMAND
328
IF DESIRED, USER SELECTS DETAILS BUTTON TO VIEW DETAILS OF COMMAND INFORMATION
330
END
332

FIG. 4b

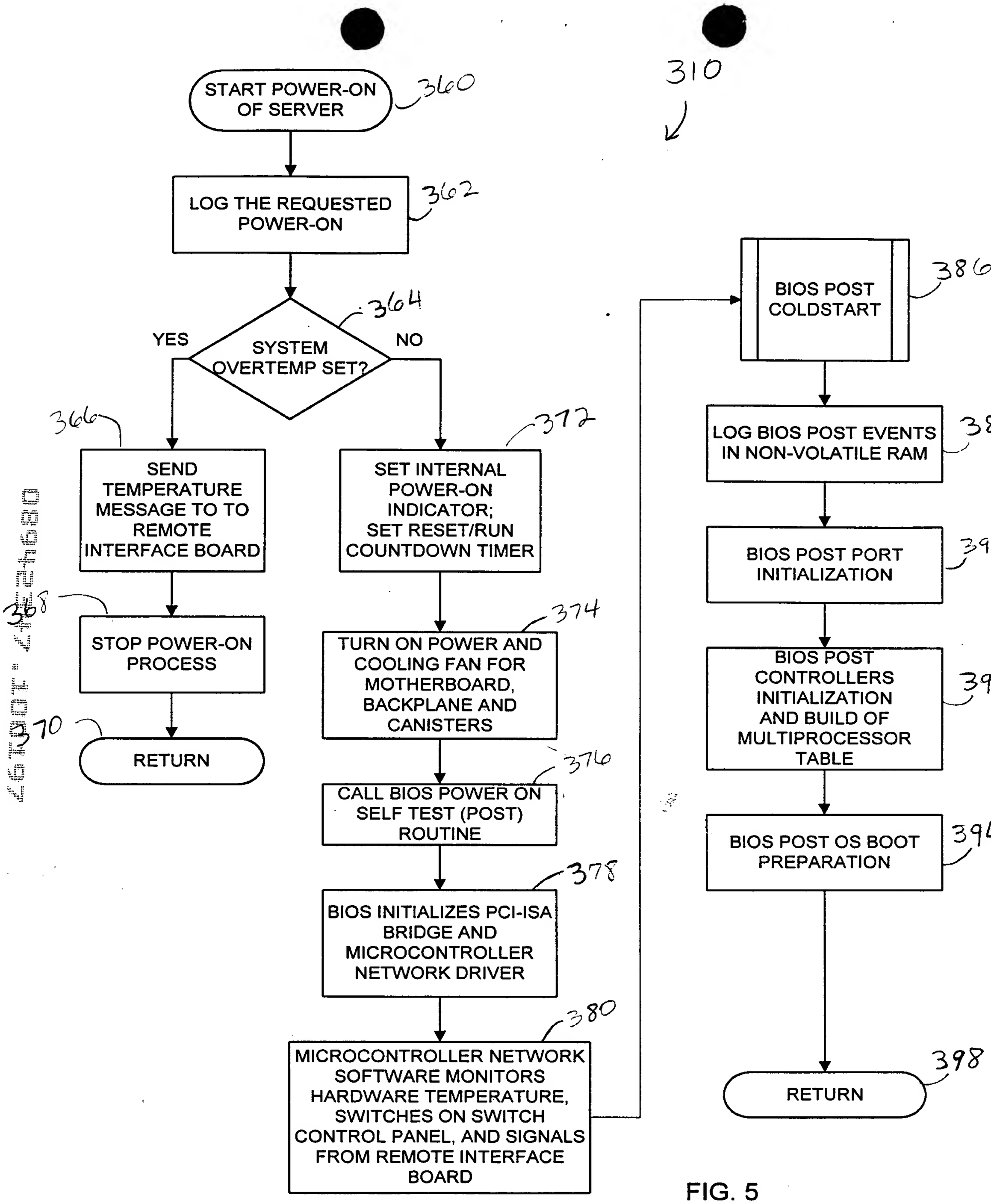

START POWER-ON OF SERVER
360
LOG THE REQUESTED POWER-ON
362
SYSTEM OVERTEMP SET?
364
YES
NO
366
SEND TEMPERATURE MESSAGE TO TO REMOTE INTERFACE BOARD
368
STOP POWER-ON PROCESS
370
RETURN
372
SET INTERNAL POWER-ON INDICATOR; SET RESET/RUN COUNTDOWN TIMER
374
TURN ON POWER AND COOLING FAN FOR MOTHERBOARD, BACKPLANE AND CANISTERS
376
CALL BIOS POWER ON SELF TEST (POST) ROUTINE
378
BIOS INITIALIZES PCI-ISA BRIDGE AND MICROCONTROLLER NETWORK DRIVER
380
MICROCONTROLLER NETWORK SOFTWARE MONITORS HARDWARE TEMPERATURE, SWITCHES ON SWITCH CONTROL PANEL, AND SIGNALS FROM REMOTE INTERFACE BOARD
310
BIOS POST COLDSTART
386
LOG BIOS POST EVENTS IN NON-VOLATILE RAM
388
BIOS POST PORT INITIALIZATION
390
BIOS POST CONTROLLERS INITIALIZATION AND BUILD OF MULTIPROCESSOR TABLE
392
BIOS POST OS BOOT PREPARATION
394
RETURN
398

FIG. 5

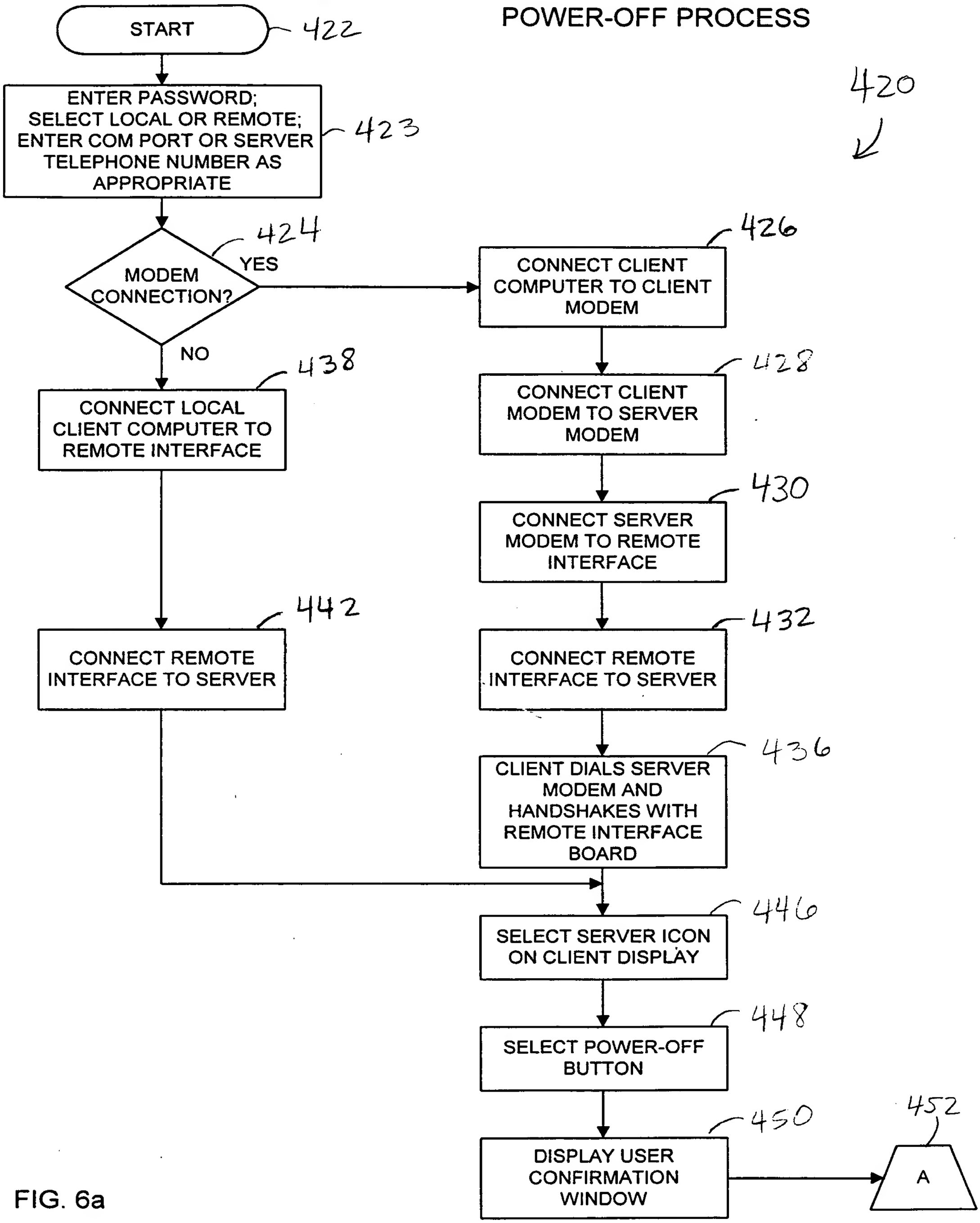


FIG. 6a

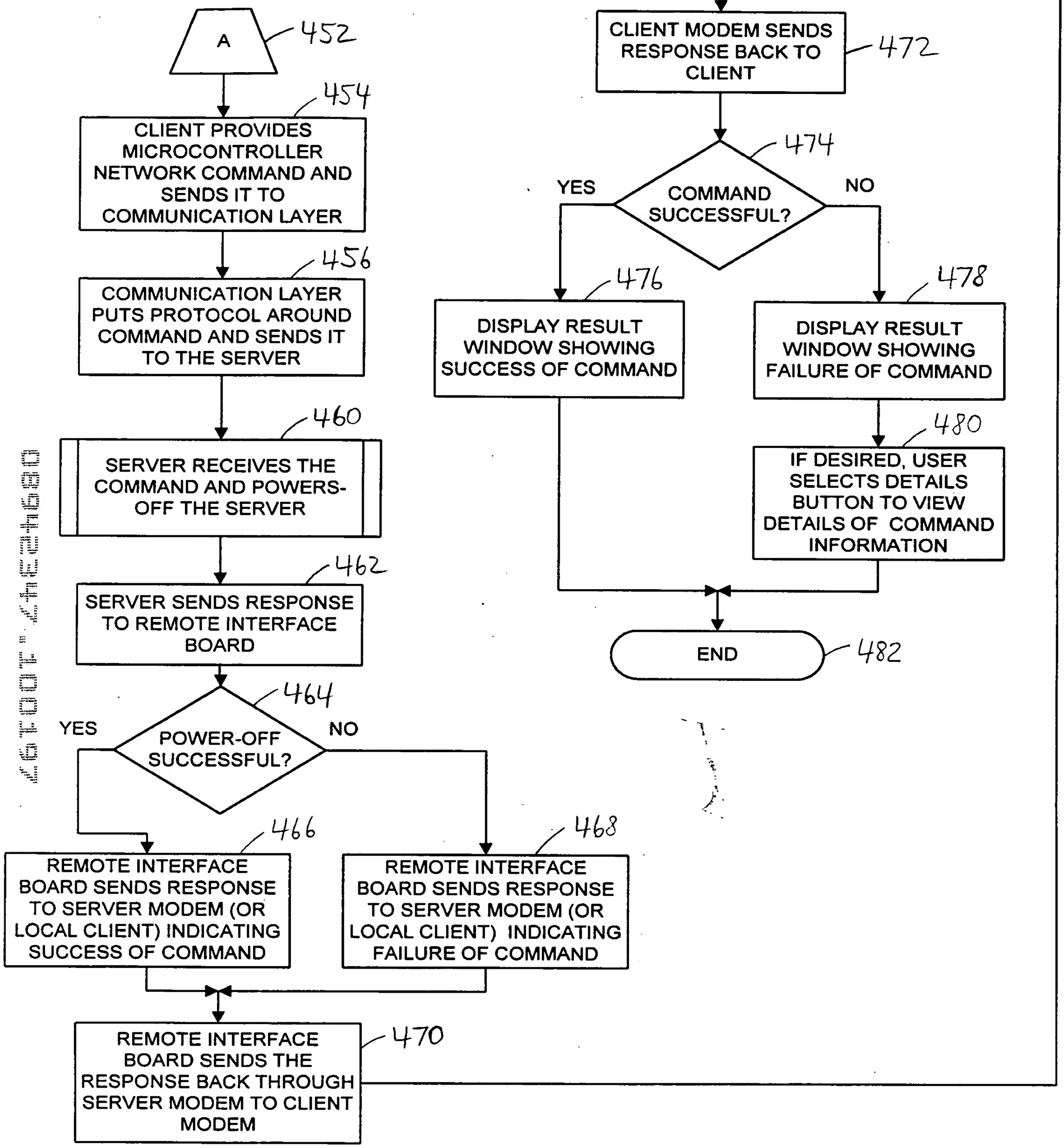

A
452
CLIENT PROVIDES MICROCONTROLLER NETWORK COMMAND AND SENDS IT TO COMMUNICATION LAYER
454
COMMUNICATION LAYER PUTS PROTOCOL AROUND COMMAND AND SENDS IT TO THE SERVER
456
SERVER RECEIVES THE COMMAND AND POWERS-OFF THE SERVER
460
SERVER SENDS RESPONSE TO REMOTE INTERFACE BOARD
462
POWER-OFF SUCCESSFUL?
464
YES
NO
REMOTE INTERFACE BOARD SENDS RESPONSE TO SERVER MODEM (OR LOCAL CLIENT) INDICATING SUCCESS OF COMMAND
466
REMOTE INTERFACE BOARD SENDS RESPONSE TO SERVER MODEM (OR LOCAL CLIENT) INDICATING FAILURE OF COMMAND
468
REMOTE INTERFACE BOARD SENDS THE RESPONSE BACK THROUGH SERVER MODEM TO CLIENT MODEM
470
CLIENT MODEM SENDS RESPONSE BACK TO CLIENT
472
COMMAND SUCCESSFUL?
474
YES
NO
DISPLAY RESULT WINDOW SHOWING SUCCESS OF COMMAND
476
DISPLAY RESULT WINDOW SHOWING FAILURE OF COMMAND
478
IF DESIRED, USER SELECTS DETAILS BUTTON TO VIEW DETAILS OF COMMAND INFORMATION
480
END
482

FIG. 6b

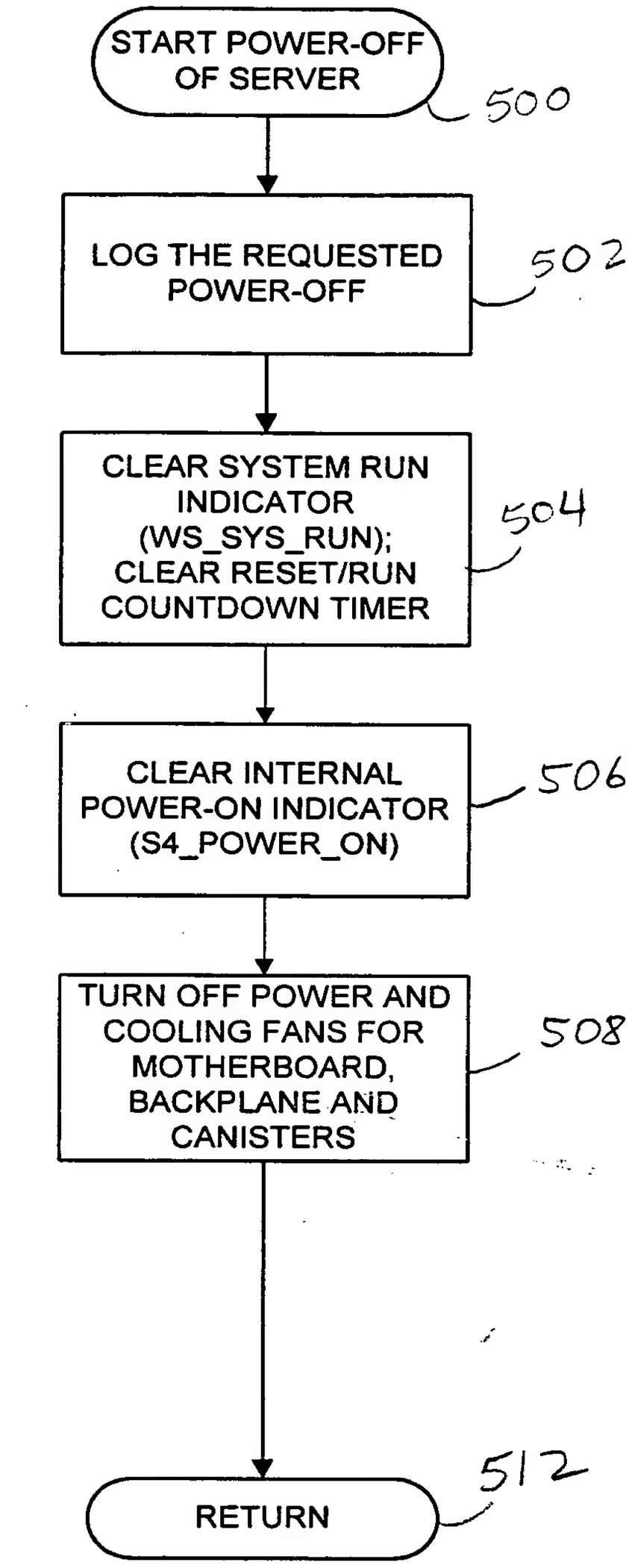

START POWER-OFF OF SERVER
500
460
LOG THE REQUESTED POWER-OFF
502
CLEAR SYSTEM RUN INDICATOR (WS_SYS_RUN); CLEAR RESET/RUN COUNTDOWN TIMER
504
CLEAR INTERNAL POWER-ON INDICATOR (S4_POWER_ON)
506
TURN OFF POWER AND COOLING FANS FOR MOTHERBOARD, BACKPLANE AND CANISTERS
508
RETURN
512

FIG. 7

RESET PROCESS

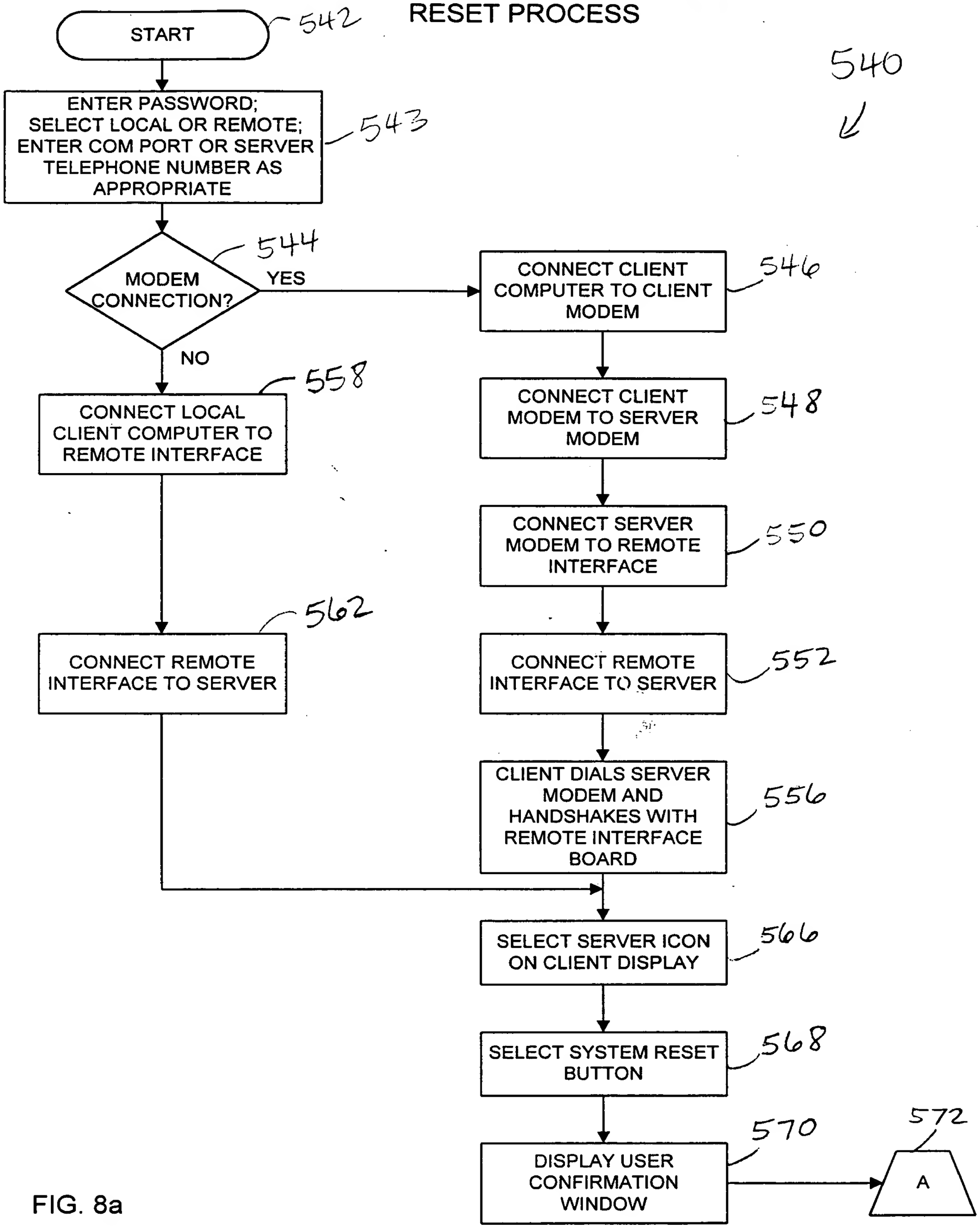


FIG. 8a

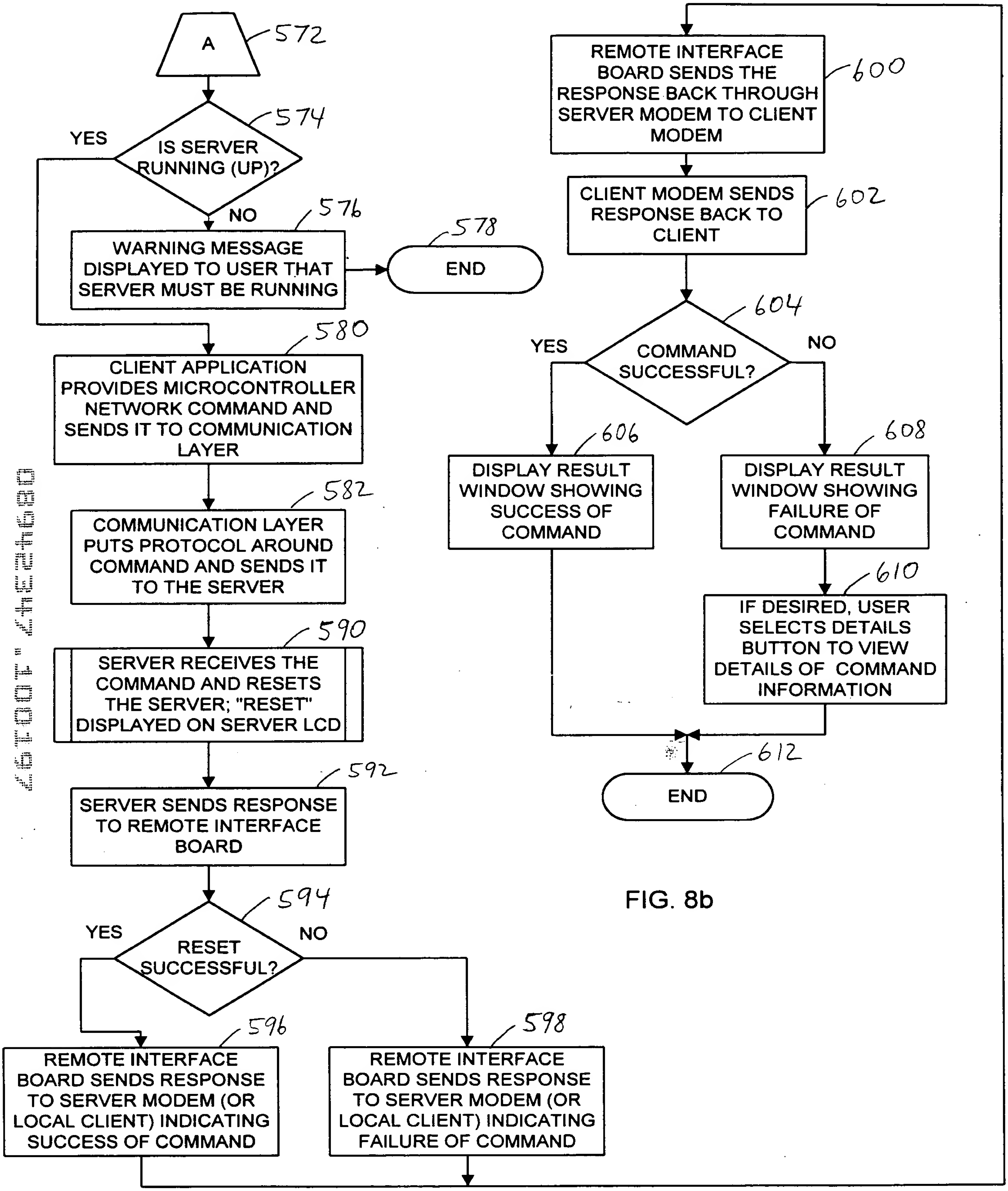

A
572
IS SERVER RUNNING (UP)?
574
YES
NO
WARNING MESSAGE DISPLAYED TO USER THAT SERVER MUST BE RUNNING
576
END
578
CLIENT APPLICATION PROVIDES MICROCONTROLLER NETWORK COMMAND AND SENDS IT TO COMMUNICATION LAYER
580
COMMUNICATION LAYER PUTS PROTOCOL AROUND COMMAND AND SENDS IT TO THE SERVER
582
SERVER RECEIVES THE COMMAND AND RESETS THE SERVER; "RESET" DISPLAYED ON SERVER LCD
590
SERVER SENDS RESPONSE TO REMOTE INTERFACE BOARD
592
RESET SUCCESSFUL?
594
YES
NO
REMOTE INTERFACE BOARD SENDS RESPONSE TO SERVER MODEM (OR LOCAL CLIENT) INDICATING SUCCESS OF COMMAND
596
REMOTE INTERFACE BOARD SENDS RESPONSE TO SERVER MODEM (OR LOCAL CLIENT) INDICATING FAILURE OF COMMAND
598
REMOTE INTERFACE BOARD SENDS THE RESPONSE BACK THROUGH SERVER MODEM TO CLIENT MODEM
600
CLIENT MODEM SENDS RESPONSE BACK TO CLIENT
602
COMMAND SUCCESSFUL?
604
YES
NO
DISPLAY RESULT WINDOW SHOWING SUCCESS OF COMMAND
606
DISPLAY RESULT WINDOW SHOWING FAILURE OF COMMAND
608
IF DESIRED, USER SELECTS DETAILS BUTTON TO VIEW DETAILS OF COMMAND INFORMATION
610
END
612

FIG. 8b

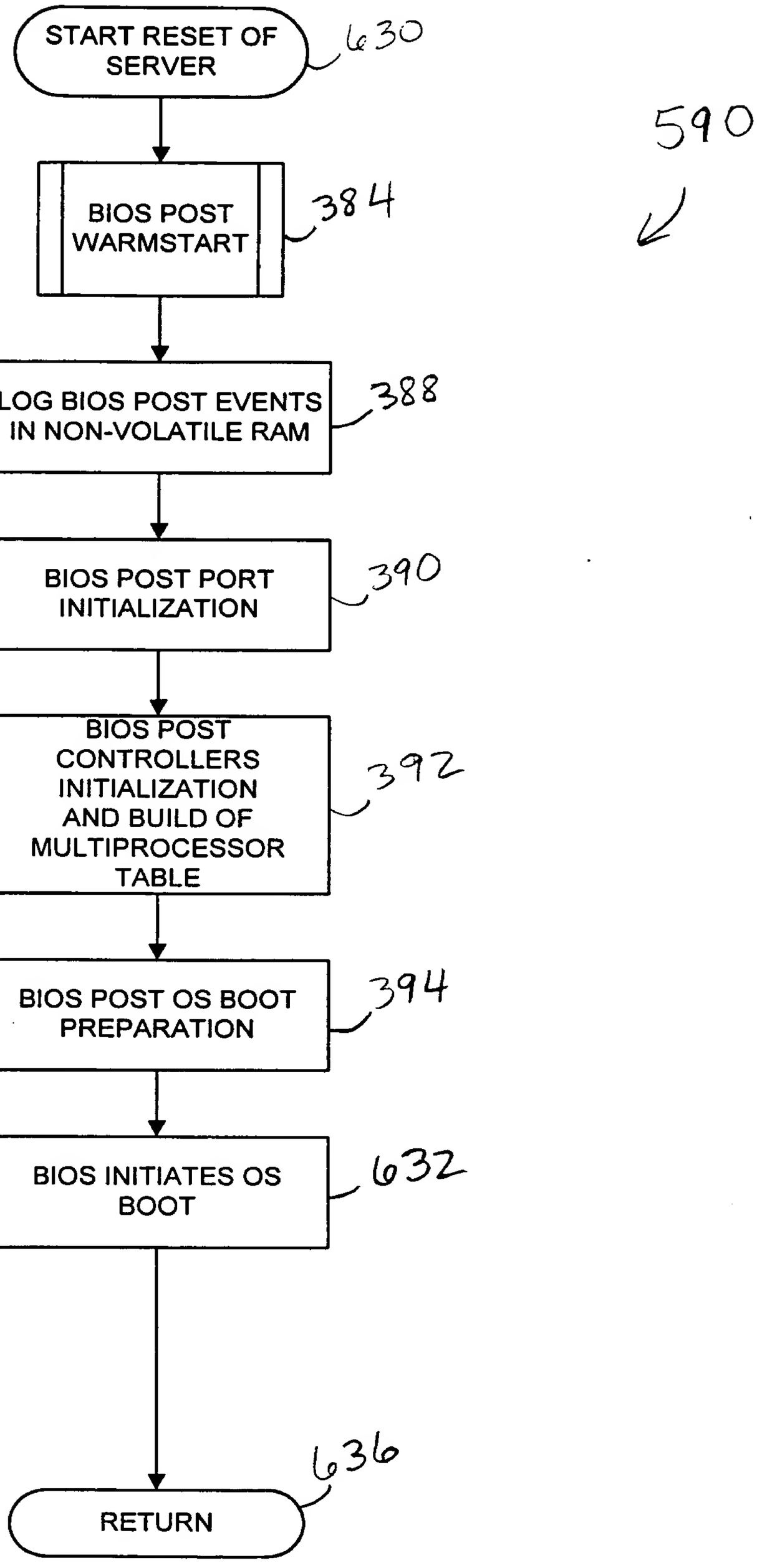

START RESET OF SERVER
630
590
BIOS POST WARMSTART
384
LOG BIOS POST EVENTS IN NON-VOLATILE RAM
388
BIOS POST PORT INITIALIZATION
390
BIOS POST CONTROLLERS INITIALIZATION AND BUILD OF MULTIPROCESSOR TABLE
392
BIOS POST OS BOOT PREPARATION
394
BIOS INITIATES OS BOOT
632
RETURN
636

FIG. 9

DISPLAYING FLIGHT RECORDER PROCESS

670

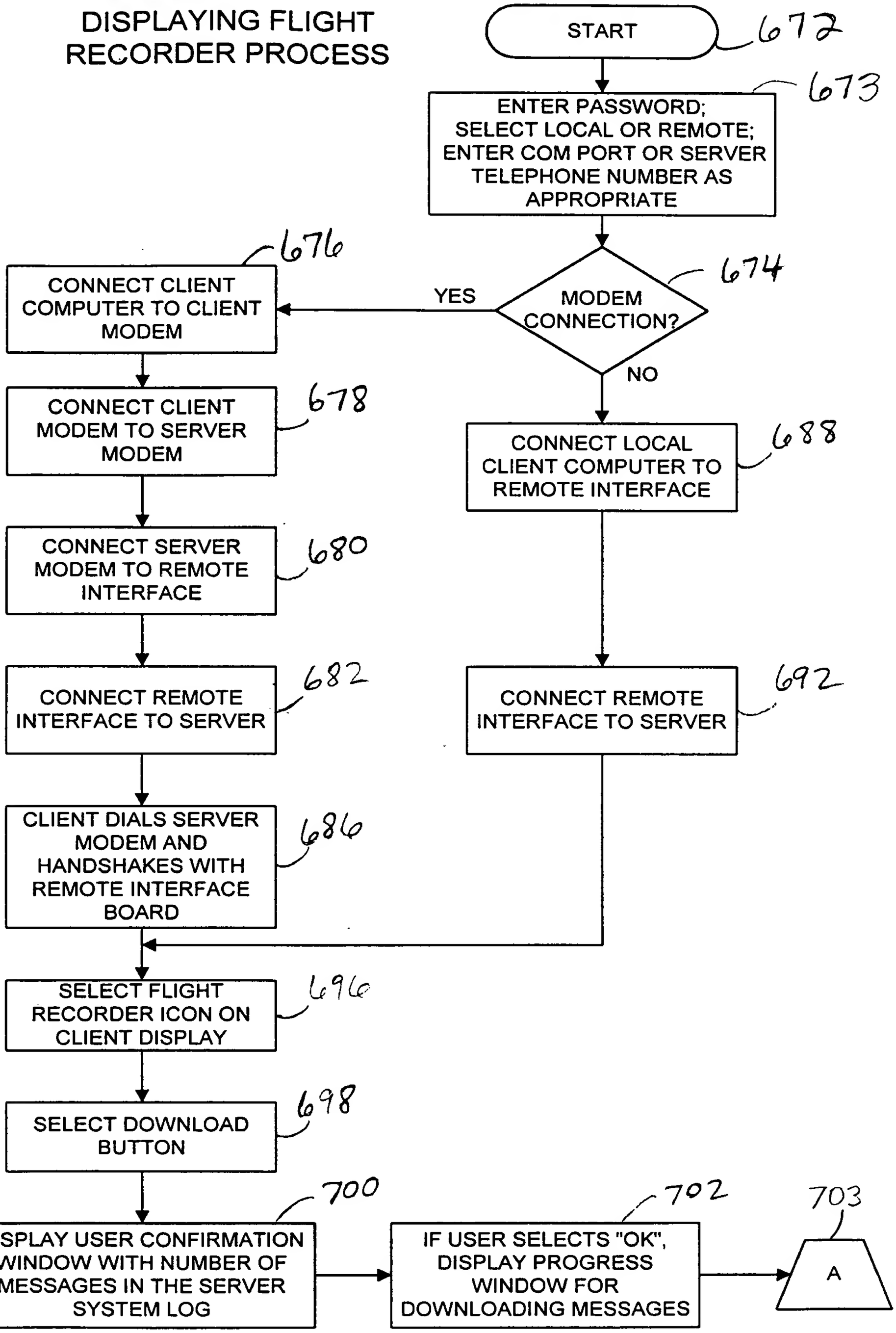


FIG. 10a

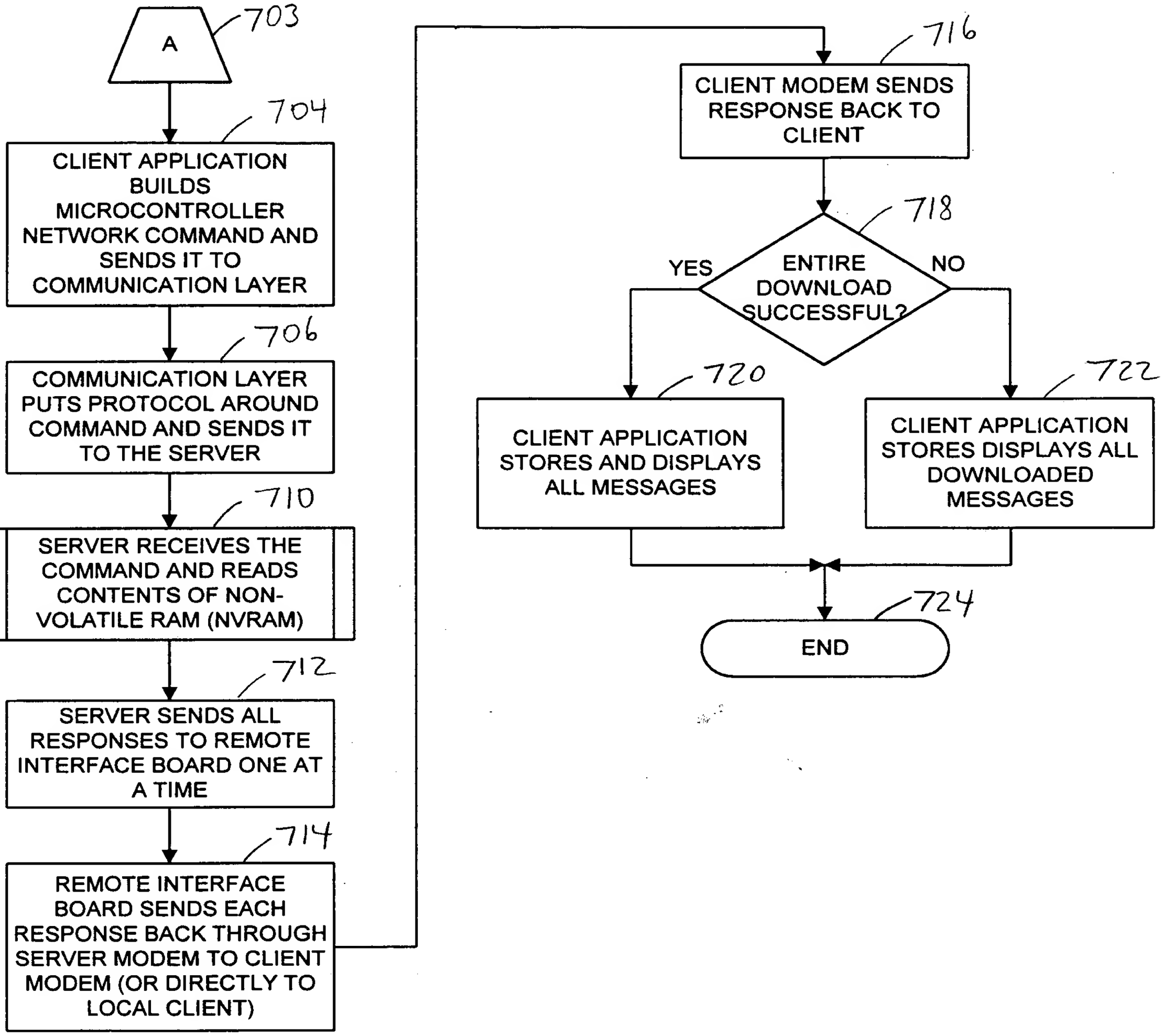

A
703
704
CLIENT APPLICATION BUILDS MICROCONTROLLER NETWORK COMMAND AND SENDS IT TO COMMUNICATION LAYER
706
COMMUNICATION LAYER PUTS PROTOCOL AROUND COMMAND AND SENDS IT TO THE SERVER
710
SERVER RECEIVES THE COMMAND AND READS CONTENTS OF NON-VOLATILE RAM (NVRAM)
712
SERVER SENDS ALL RESPONSES TO REMOTE INTERFACE BOARD ONE AT A TIME
714
REMOTE INTERFACE BOARD SENDS EACH RESPONSE BACK THROUGH SERVER MODEM TO CLIENT MODEM (OR DIRECTLY TO LOCAL CLIENT)
716
CLIENT MODEM SENDS RESPONSE BACK TO CLIENT
718
ENTIRE DOWNLOAD SUCCESSFUL?
YES
NO
720
CLIENT APPLICATION STORES AND DISPLAYS ALL MESSAGES
722
CLIENT APPLICATION STORES DISPLAYS ALL DOWNLOADED MESSAGES
724
END

FIG. 10b

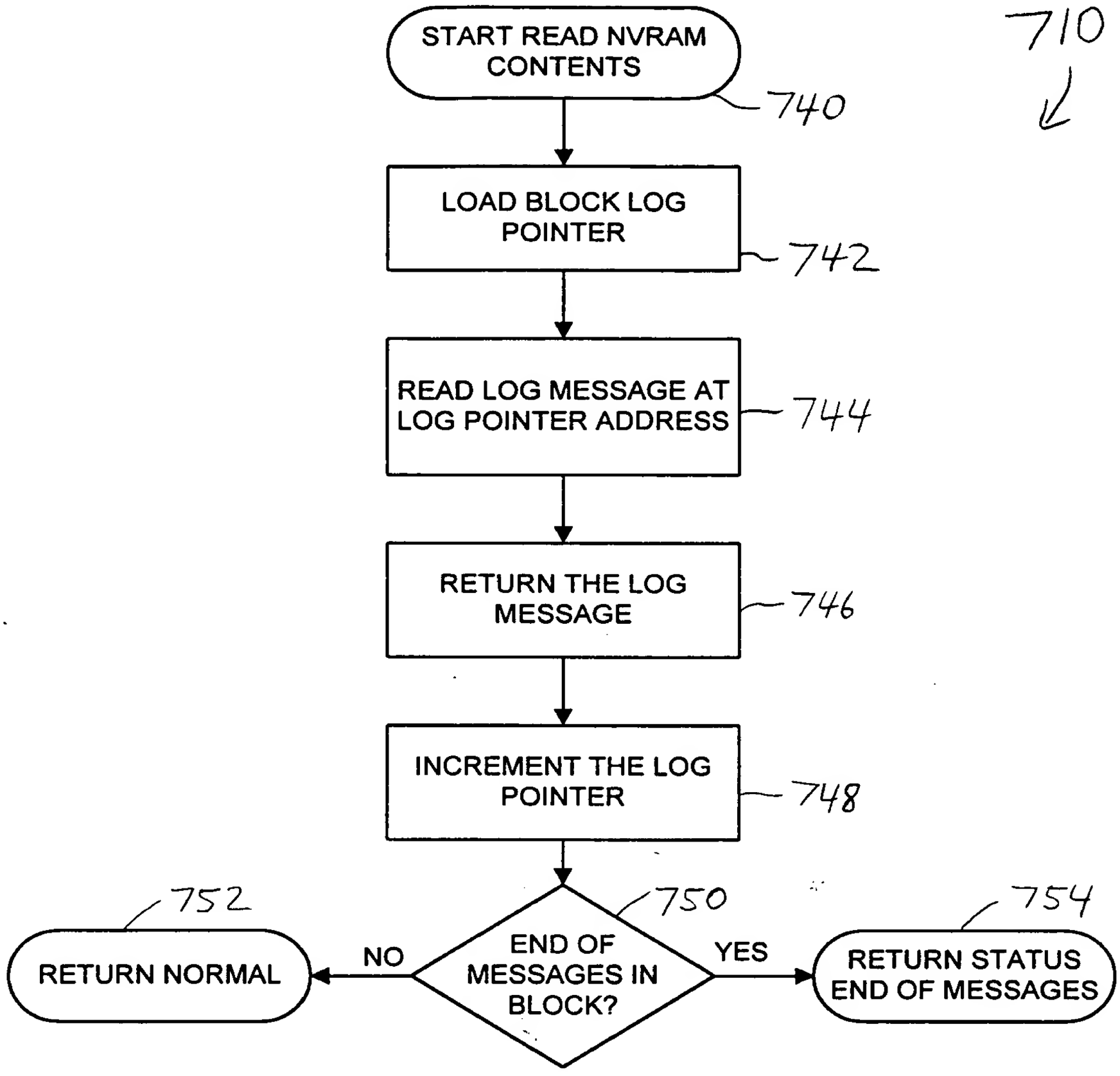

START READ NVRAM CONTENTS
740
710
LOAD BLOCK LOG POINTER
742
READ LOG MESSAGE AT LOG POINTER ADDRESS
744
RETURN THE LOG MESSAGE
746
INCREMENT THE LOG POINTER
748
752
750
754
RETURN NORMAL
NO
END OF MESSAGES IN BLOCK?
YES
RETURN STATUS END OF MESSAGES

FIG. 11

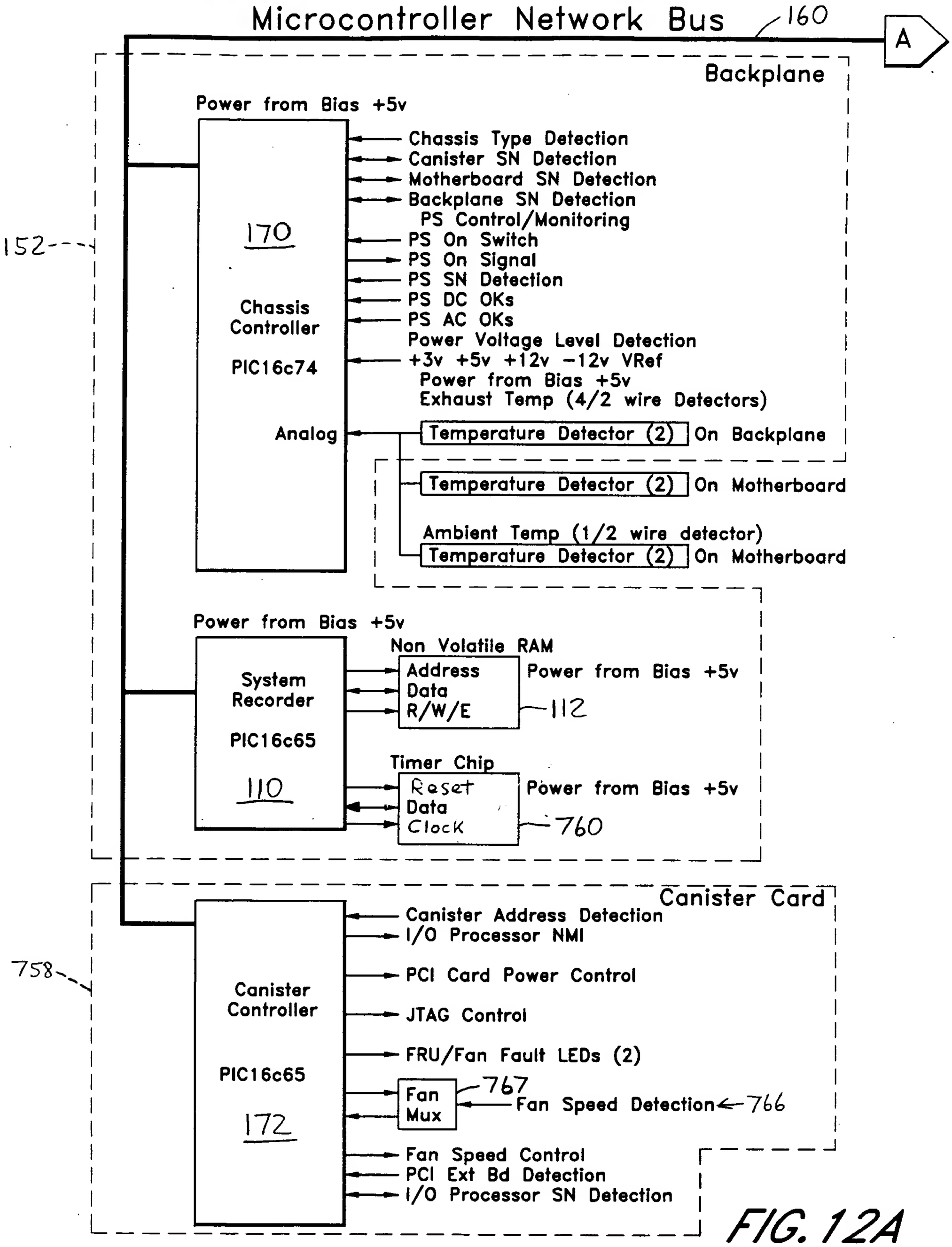

Microcontroller Network Bus
160
A
Backplane
Power from Bias +5v
152
170
Chassis Controller
PIC16c74
Chassis Type Detection
Canister SN Detection
Motherboard SN Detection
Backplane SN Detection
PS Control/Monitoring
PS On Switch
PS On Signal
PS SN Detection
PS DC OKs
PS AC OKs
Power Voltage Level Detection
+3v +5v +12v −12v VRef
Power from Bias +5v
Exhaust Temp (4/2 wire Detectors)
Analog
Temperature Detector (2) On Backplane
Temperature Detector (2) On Motherboard
Ambient Temp (1/2 wire detector)
Temperature Detector (2) On Motherboard
Power from Bias +5v
System Recorder
PIC16c65
110
Non Volatile RAM
Address
Data
R/W/E
112
Power from Bias +5v
Timer Chip
Reset
Data
Clock
760
Power from Bias +5v
Canister Card
758
Canister Controller
PIC16c65
172
Canister Address Detection
I/O Processor NMI
PCI Card Power Control
JTAG Control
FRU/Fan Fault LEDs (2)
Fan Mux
767
Fan Speed Detection
766
Fan Speed Control
PCI Ext Bd Detection
I/O Processor SN Detection

FIG. 12A

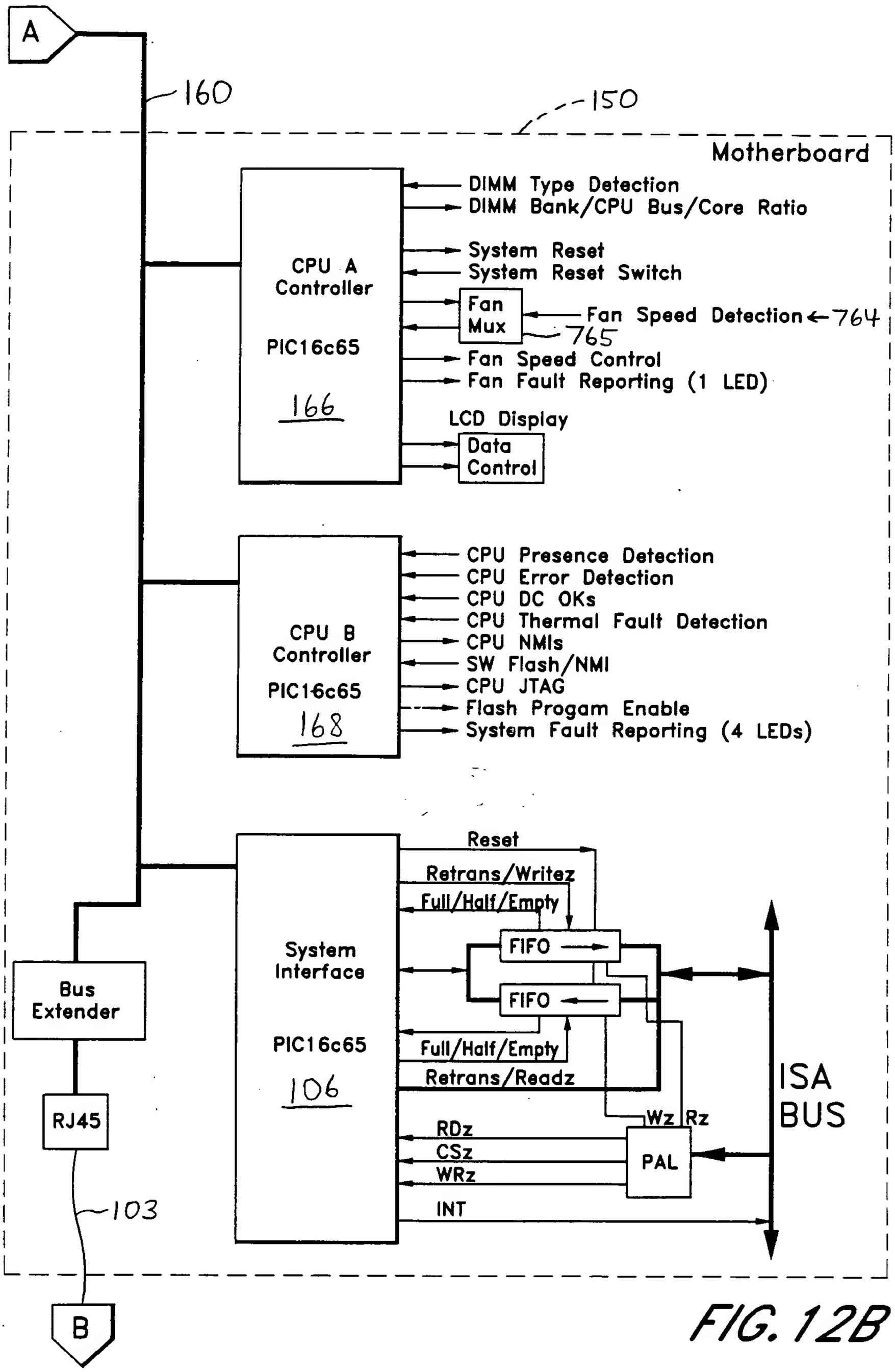

A
160
150
Motherboard
CPU A Controller
PIC16c65
166
DIMM Type Detection
DIMM Bank/CPU Bus/Core Ratio
System Reset
System Reset Switch
Fan Mux
Fan Speed Detection
764
765
Fan Speed Control
Fan Fault Reporting (1 LED)
LCD Display
Data Control
CPU B Controller
PIC16c65
168
CPU Presence Detection
CPU Error Detection
CPU DC OKs
CPU Thermal Fault Detection
CPU NMIs
SW Flash/NMI
CPU JTAG
Flash Progam Enable
System Fault Reporting (4 LEDs)
Bus Extender
RJ45
103
B
System Interface
PIC16c65
106
Reset
Retrans/Writez
Full/Half/Empty
FIFO
FIFO
Full/Half/Empty
Retrans/Readz
Wz
Rz
RDz
CSz
WRz
PAL
INT
ISA BUS

FIG. 12B

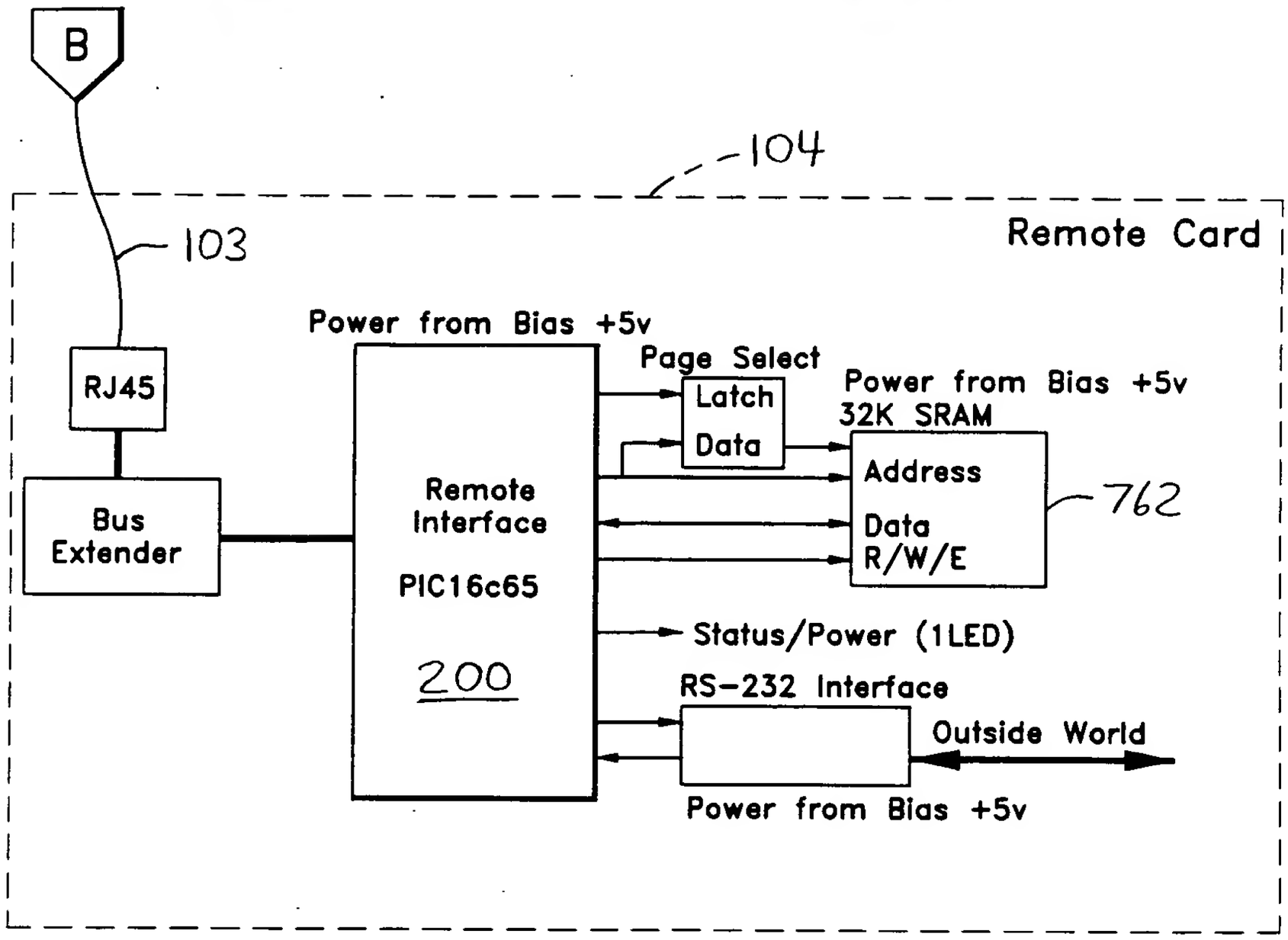

B
104
103
Remote Card
Power from Bias +5v
RJ45
Page Select
Latch
Data
Power from Bias +5v
32K SRAM
Address
Data
R/W/E
762
Bus
Extender
Remote
Interface
PIC16c65
200
Status/Power (1LED)
RS-232 Interface
Outside World
Power from Bias +5v

FIG. 12C

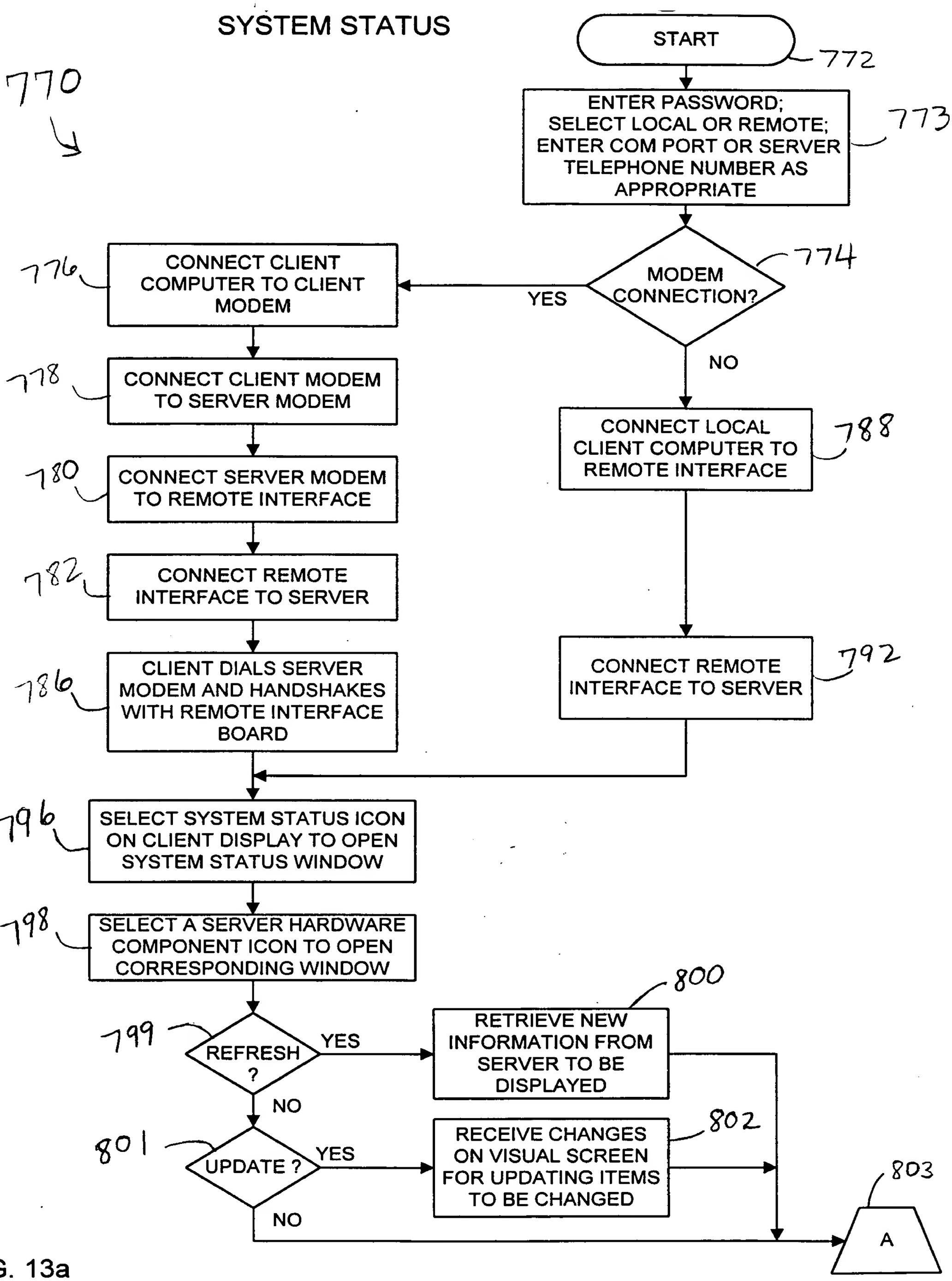

SYSTEM STATUS
770
START
772
ENTER PASSWORD;
SELECT LOCAL OR REMOTE;
ENTER COM PORT OR SERVER
TELEPHONE NUMBER AS
APPROPRIATE
773
MODEM
CONNECTION?
774
YES
NO
776
CONNECT CLIENT
COMPUTER TO CLIENT
MODEM
778
CONNECT CLIENT MODEM
TO SERVER MODEM
780
CONNECT SERVER MODEM
TO REMOTE INTERFACE
782
CONNECT REMOTE
INTERFACE TO SERVER
786
CLIENT DIALS SERVER
MODEM AND HANDSHAKES
WITH REMOTE INTERFACE
BOARD
788
CONNECT LOCAL
CLIENT COMPUTER TO
REMOTE INTERFACE
792
CONNECT REMOTE
INTERFACE TO SERVER
796
SELECT SYSTEM STATUS ICON
ON CLIENT DISPLAY TO OPEN
SYSTEM STATUS WINDOW
798
SELECT A SERVER HARDWARE
COMPONENT ICON TO OPEN
CORRESPONDING WINDOW
799
REFRESH
?
YES
NO
800
RETRIEVE NEW
INFORMATION FROM
SERVER TO BE
DISPLAYED
801
UPDATE ?
YES
NO
802
RECEIVE CHANGES
ON VISUAL SCREEN
FOR UPDATING ITEMS
TO BE CHANGED
803
A

FIG. 13a

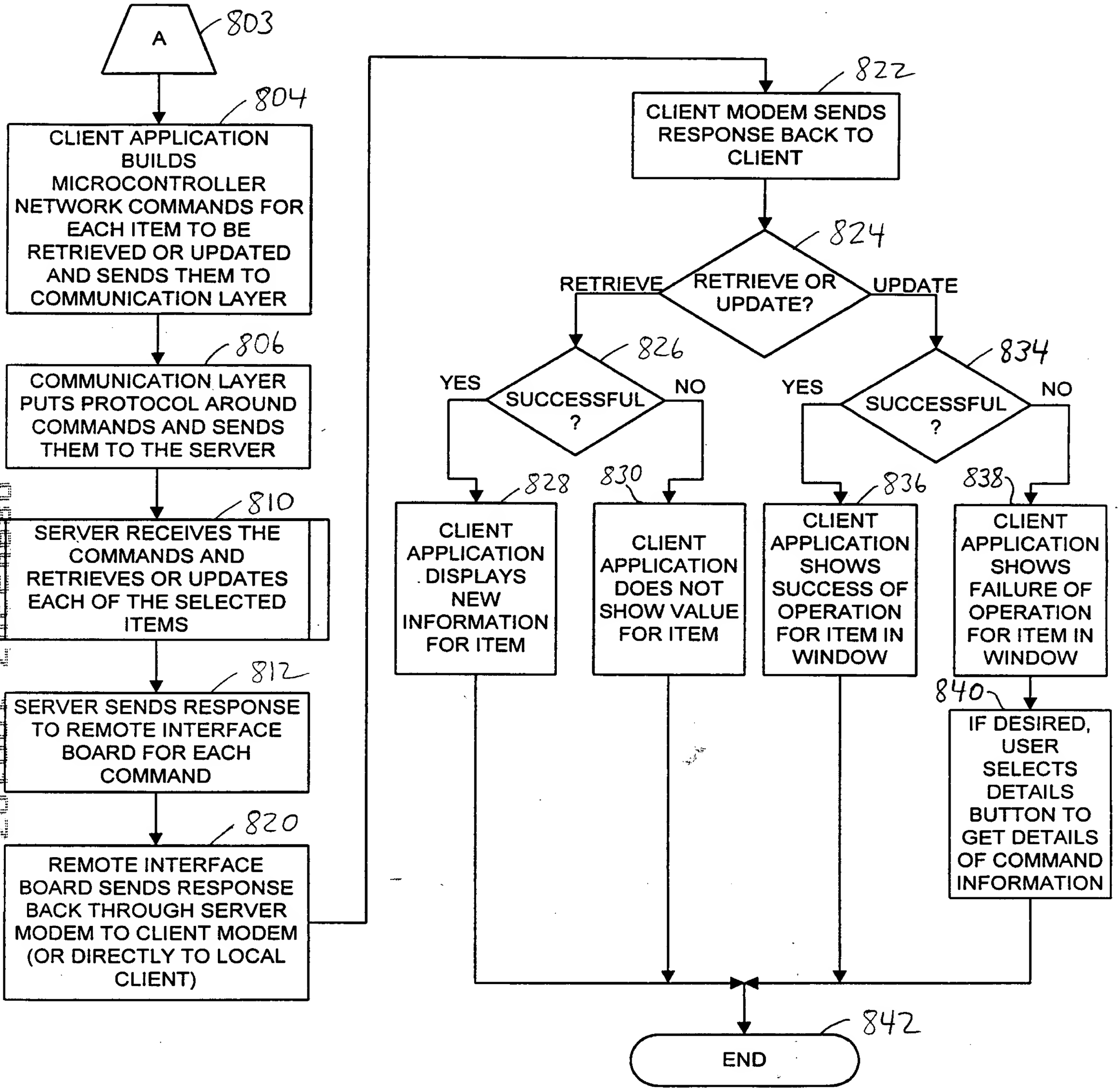

A
803
804
CLIENT APPLICATION BUILDS MICROCONTROLLER NETWORK COMMANDS FOR EACH ITEM TO BE RETRIEVED OR UPDATED AND SENDS THEM TO COMMUNICATION LAYER
806
COMMUNICATION LAYER PUTS PROTOCOL AROUND COMMANDS AND SENDS THEM TO THE SERVER
810
SERVER RECEIVES THE COMMANDS AND RETRIEVES OR UPDATES EACH OF THE SELECTED ITEMS
812
SERVER SENDS RESPONSE TO REMOTE INTERFACE BOARD FOR EACH COMMAND
820
REMOTE INTERFACE BOARD SENDS RESPONSE BACK THROUGH SERVER MODEM TO CLIENT MODEM (OR DIRECTLY TO LOCAL CLIENT)
822
CLIENT MODEM SENDS RESPONSE BACK TO CLIENT
824
RETRIEVE OR UPDATE?
RETRIEVE
UPDATE
826
SUCCESSFUL ?
YES
NO
828
CLIENT APPLICATION DISPLAYS NEW INFORMATION FOR ITEM
830
CLIENT APPLICATION DOES NOT SHOW VALUE FOR ITEM
834
SUCCESSFUL ?
YES
NO
836
CLIENT APPLICATION SHOWS SUCCESS OF OPERATION FOR ITEM IN WINDOW
838
CLIENT APPLICATION SHOWS FAILURE OF OPERATION FOR ITEM IN WINDOW
840
IF DESIRED, USER SELECTS DETAILS BUTTON TO GET DETAILS OF COMMAND INFORMATION
842
END

FIG. 13b

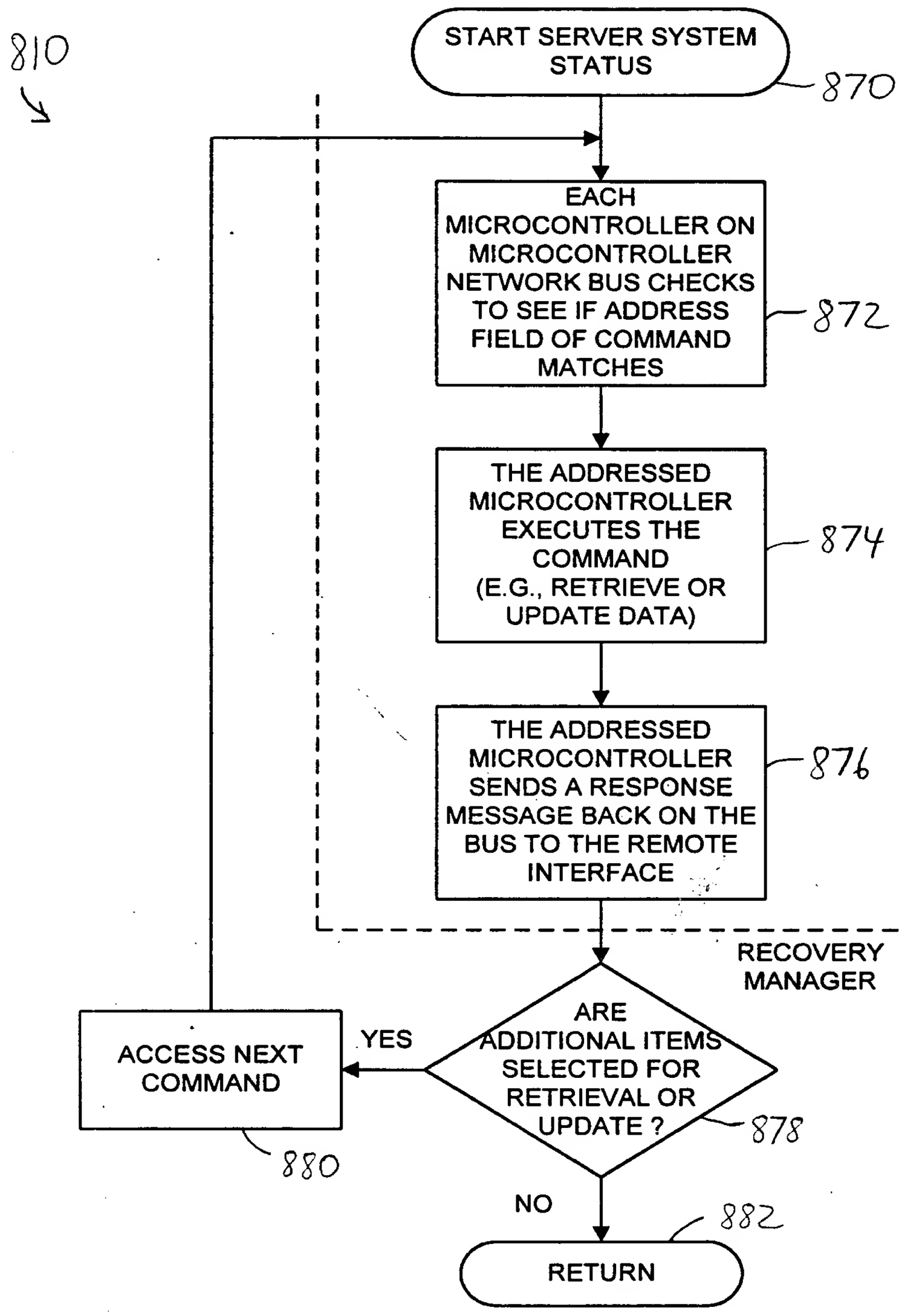

810
START SERVER SYSTEM STATUS
870
EACH MICROCONTROLLER ON MICROCONTROLLER NETWORK BUS CHECKS TO SEE IF ADDRESS FIELD OF COMMAND MATCHES
872
THE ADDRESSED MICROCONTROLLER EXECUTES THE COMMAND (E.G., RETRIEVE OR UPDATE DATA)
874
THE ADDRESSED MICROCONTROLLER SENDS A RESPONSE MESSAGE BACK ON THE BUS TO THE REMOTE INTERFACE
876
RECOVERY MANAGER
ARE ADDITIONAL ITEMS SELECTED FOR RETRIEVAL OR UPDATE ?
878
YES
ACCESS NEXT COMMAND
880
NO
882
RETURN

FIG. 14

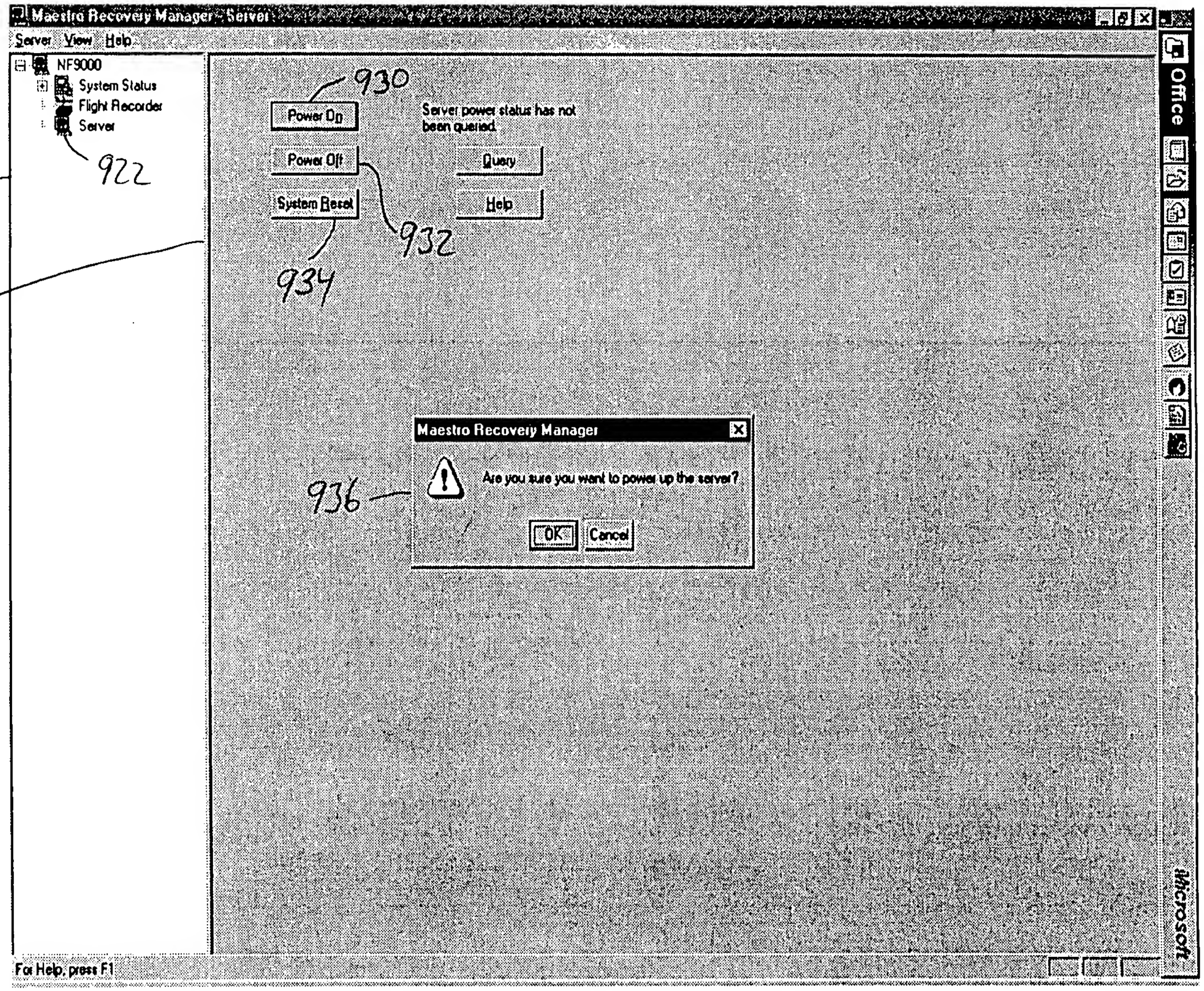

Maestro Recovery Manager - Server
Server View Help
NF9000
System Status
Flight Recorder
Server
920
922
928
930
Power On
Server power status has not been queried.
Power Off
Query
System Reset
Help
932
934
Maestro Recovery Manager
936
Are you sure you want to power up the server?
OK
Cancel
Office
Microsoft
For Help, press F1

FIG. 15

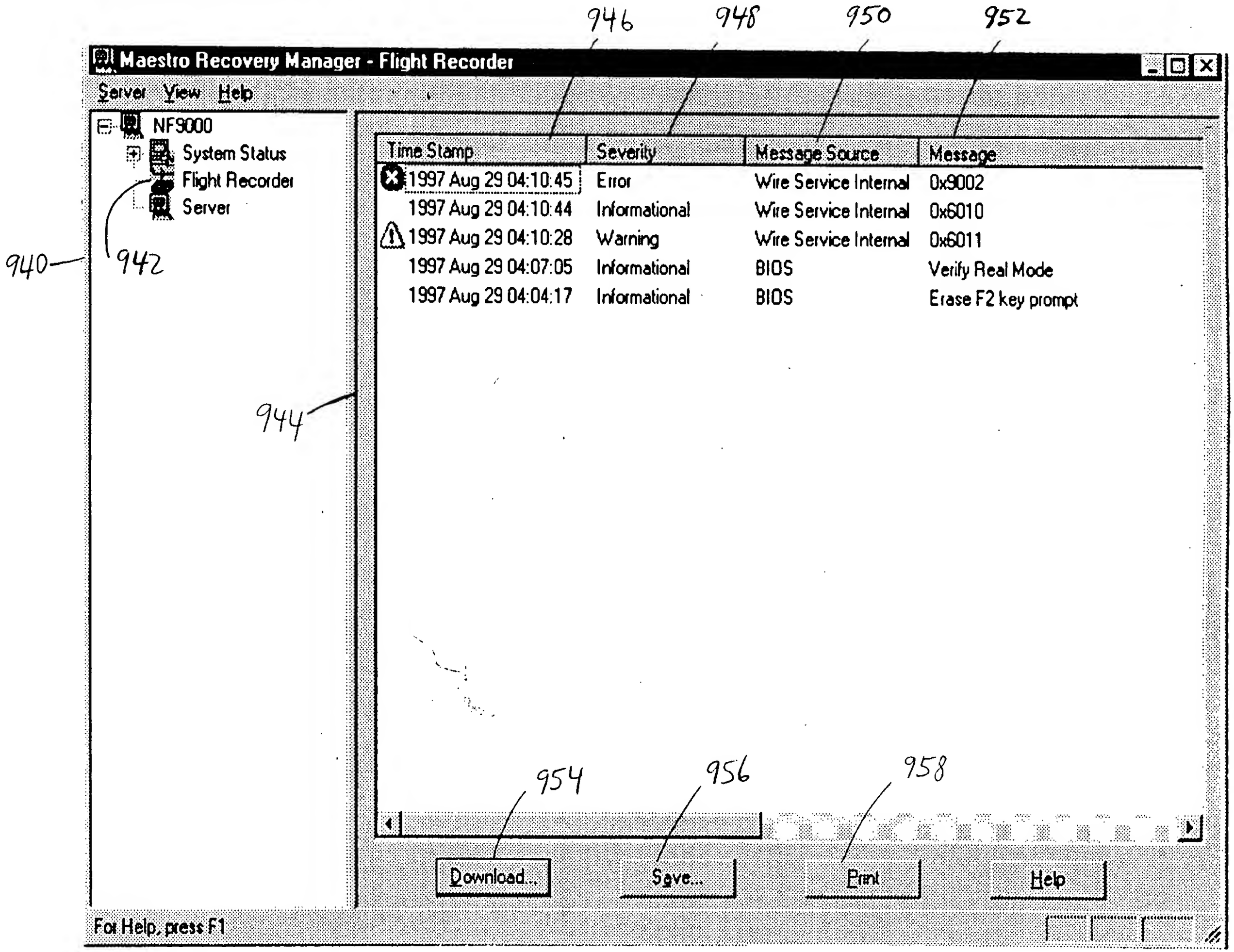

946
948
950
952
Maestro Recovery Manager - Flight Recorder
Server View Help
NF9000
System Status
Flight Recorder
Server
940
942
944
Time Stamp
Severity
Message Source
Message
1997 Aug 29 04:10:45
Error
Wire Service Internal
0x9002
1997 Aug 29 04:10:44
Informational
Wire Service Internal
0x6010
1997 Aug 29 04:10:28
Warning
Wire Service Internal
0x6011
1997 Aug 29 04:07:05
Informational
BIOS
Verify Real Mode
1997 Aug 29 04:04:17
Informational
BIOS
Erase F2 key prompt
954
956
958
Download...
Save...
Print
Help
For Help, press F1

FIG. 16

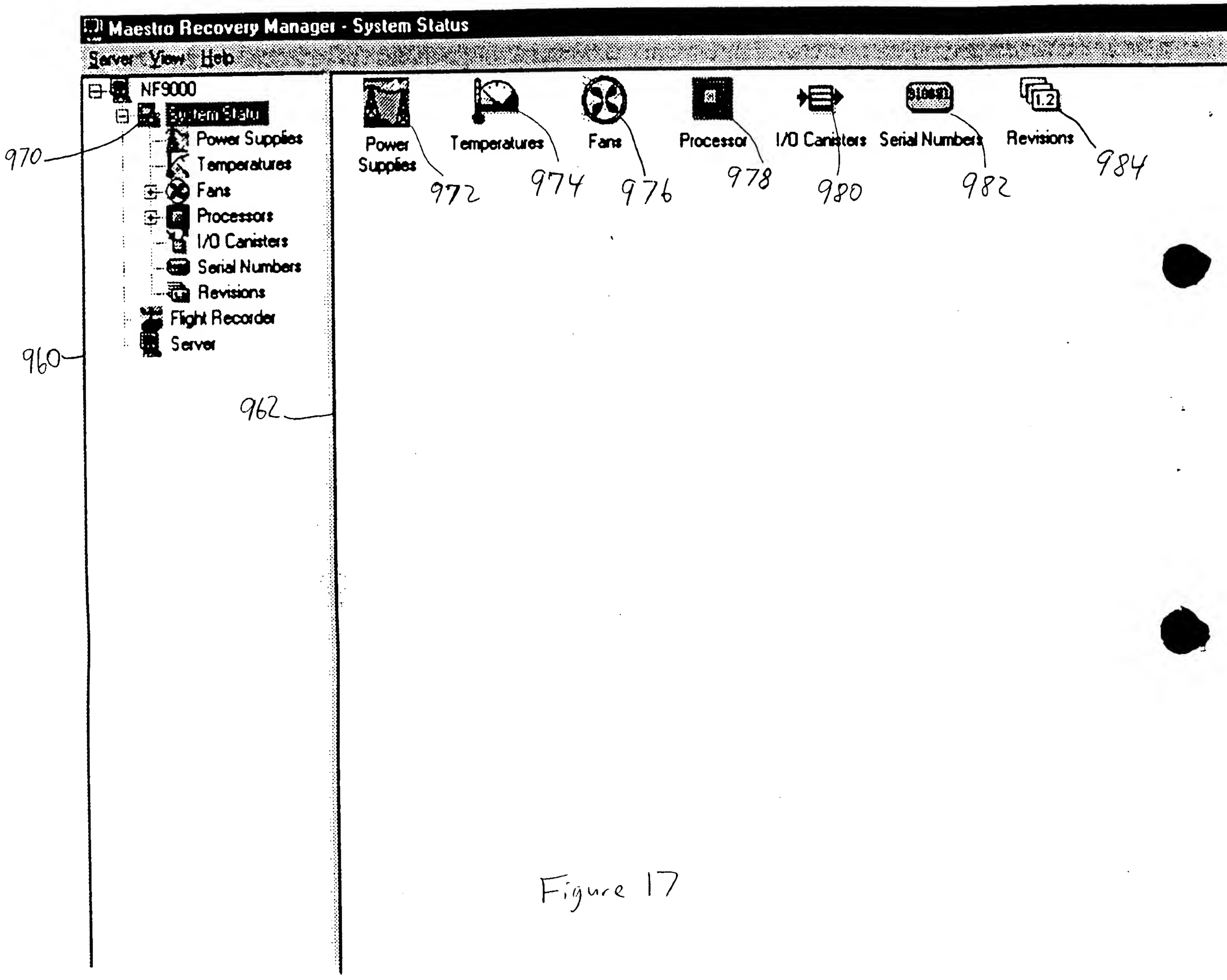
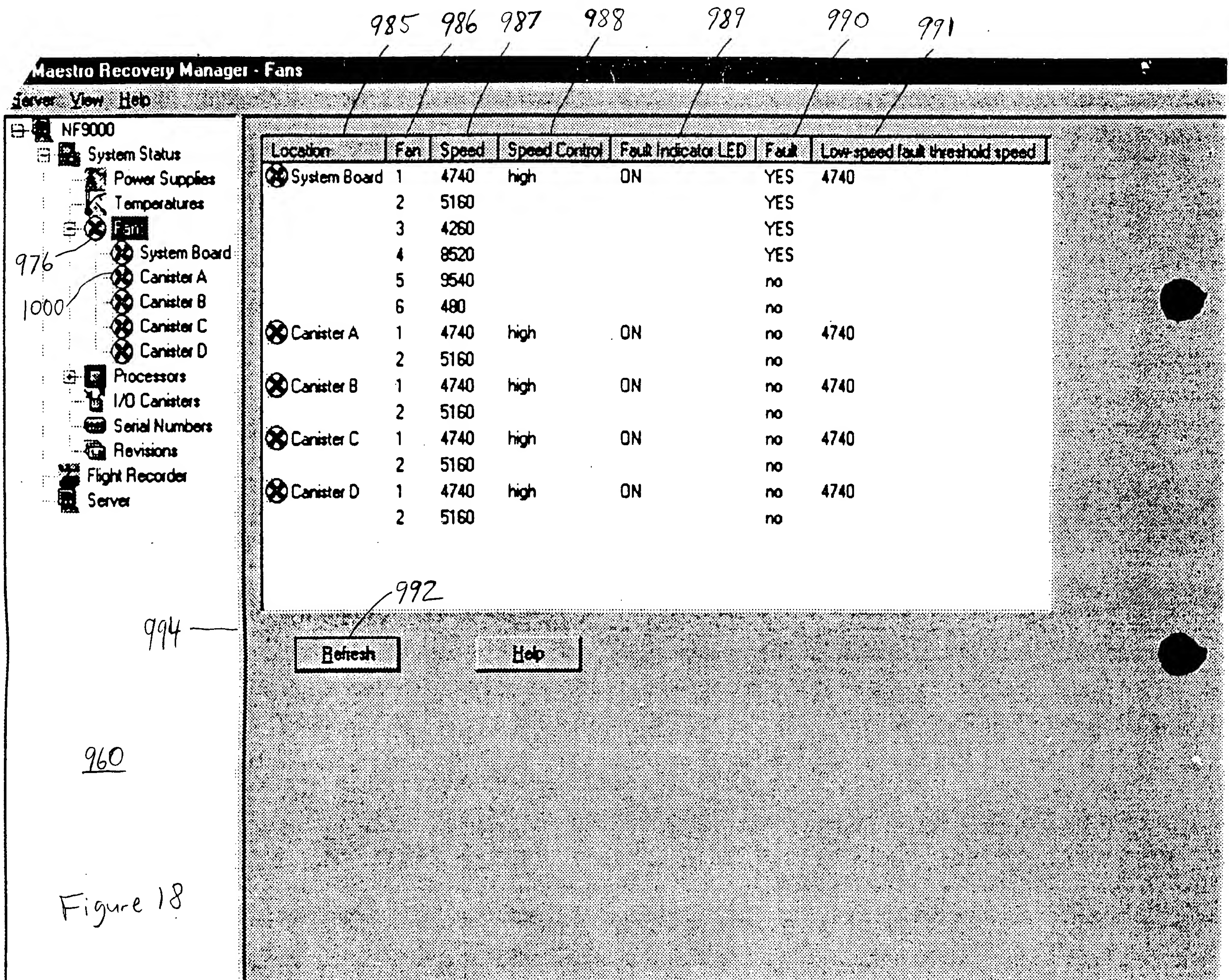

Maestro Recovery Manager - System Status
Server View Help
NF9000
System Status
Power Supplies
Temperatures
Fans
Processors
I/O Canisters
Serial Numbers
Revisions
Flight Recorder
Server
970
960
962
Power Supplies
Temperatures
Fans
Processor
I/O Canisters
Serial Numbers
Revisions
972
974
976
978
980
982
984

Figure 17



985
986
987
988
989
990
991
Maestro Recovery Manager - Fans
Server View Help
NF9000
System Status
Power Supplies
Temperatures
Fans
System Board
Canister A
Canister B
Canister C
Canister D
Processors
I/O Canisters
Serial Numbers
Revisions
Flight Recorder
Server
976
1000
Location | Fan | Speed | Speed Control | Fault Indicator LED | Fault | Low-speed fault threshold speed
System Board 1 4740 high ON YES 4740
2 5160 YES
3 4260 YES
4 8520 YES
5 9540 no
6 480 no
Canister A 1 4740 high ON no 4740
2 5160 no
Canister B 1 4740 high ON no 4740
2 5160 no
Canister C 1 4740 high ON no 4740
2 5160 no
Canister D 1 4740 high ON no 4740
2 5160 no
992
994
Refresh
Help
960

Figure 18

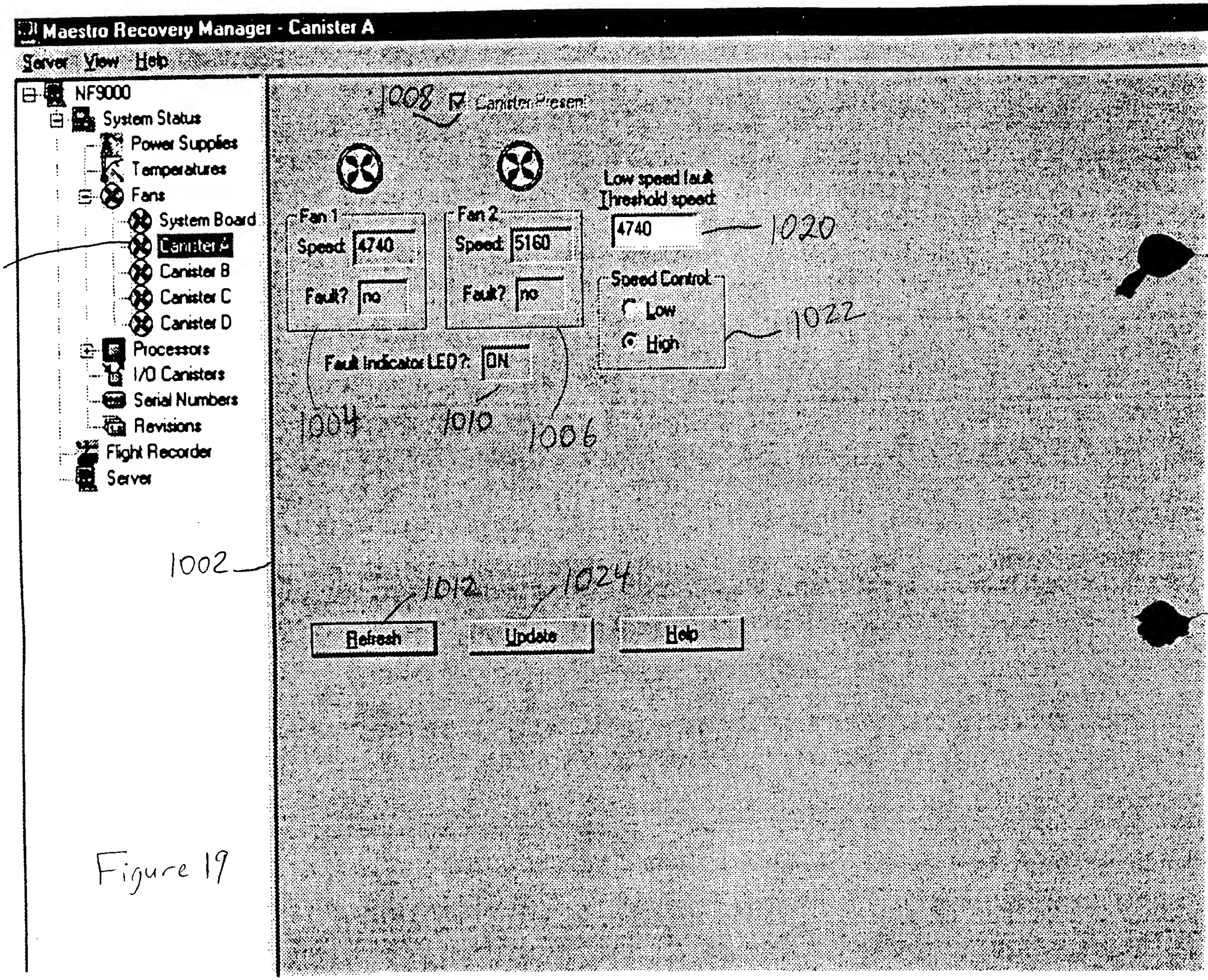

Maestro Recovery Manager - Canister A
Server View Help
NF9000
System Status
Power Supplies
Temperatures
Fans
System Board
Canister A
Canister B
Canister C
Canister D
Processors
I/O Canisters
Serial Numbers
Revisions
Flight Recorder
Server
1000
1002
1008
Canister Present
Fan 1
Speed: 4740
Fault? no
Fan 2
Speed: 5160
Fault? no
Low speed fault
Threshold speed:
4740
1020
Speed Control
Low
High
1022
Fault Indicator LED?: ON
1004
1010
1006
1012
1024
Refresh
Update
Help

Figure 19